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DEPARTMENT OF THE ARMY
TECHNICAL MANUAL
TM 11-2680

DEPARTMENT OF THE AIR
FORCE TECHNICAL ORDER
TO 16-35AS341-6

ANTENNA ASSEMBLY

AS 341/GR

UNITED STATES OF AMERICA WAR OFFICE

MCMXLVII

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

NOVEMBER 1953

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TECHNICAL MANUAL No. 11-2680
TECHNICAL ORDER No. 16-35AS341-6

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
WASHINGTON 25, D. C., *2 November 1953*

ANTENNA ASSEMBLY AS-341/GR

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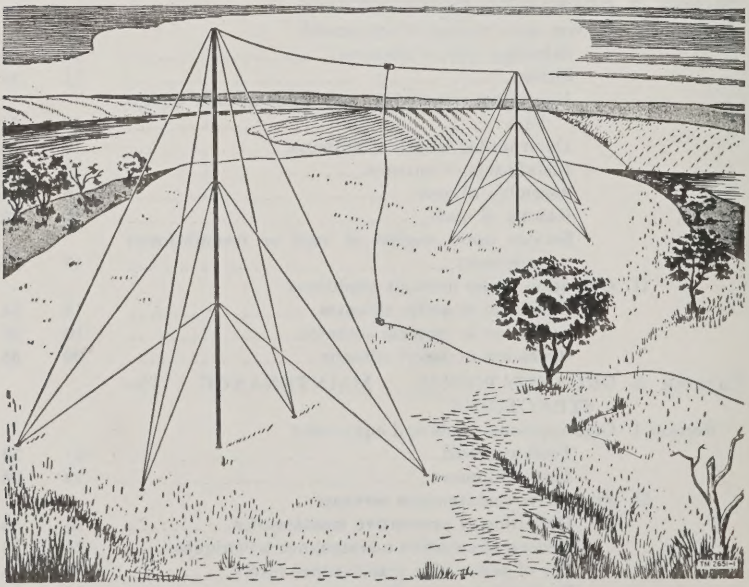

Figure 1. Antenna Assembly AS-341/GR set up as half-wave antenna.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

This manual contains information for the installation, operation, maintenance, and repair of Antenna Assembly AS–341/GR (fig. 1). In addition to these instructions, there are two appendixes covering a list of references and an indentification table of parts.

2. Forms and Records

The following forms will be used for reporting unsatisfactory conditions of Army materiel and equipment.

a. DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745–45–5 (Army), Navy Shipping Guide Article 1850–4 and AFR 71–4 (Air Force).

b. DA Form 468, Unsatisfactory Equipment Report, will be filled out and forwarded to the Office of the Chief Signal Officer as prescribed in SR 700–45–5.

c. AF Form 54, Unsatisfactory Report, will be filled out and forwarded to Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, as prescribed in SR 700–45–5 and AFR 65–26.

d. DA Form 11–238 (fig. 21), Operator First Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding Carrier, Radar), will be prepared in accordance with instructions on the back of the form.

e. DA Form 11–239 (fig. 22), Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar), will be prepared in accordance with instructions on the back of the form,

f. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. Antenna Assembly AS–341/GR is a portable half-wave antenna assembly designed for radio reception. The antenna is used for operating within the frequency range of 1.5 to 20 mc (megacycles). Several types of antennas can be constructed by using various combinations of the components supplied.

b. Antenna Assembly AS–341/GR consists of two Frames MX–1116/GRA–4 (fig. 2) each of which contains sixteen Mast Sections AB–85/GRA–4 (fig. 4), Bag BG–102–A, six Mast Sections MS–116–A, two Mast Sections MS–117–A, and two Mast Section MS–118–A, also known as whip sections. This assembly also includes wire, insulators, halyards, the counterpoise assembly, an antenna (whip) adapter, r-f (radio-frequency) cables, and associated guys and stakes. The components may be installed in various combinations, depending on the type of terrain at the site where the antenna is to be erected.

c. The horizontal antenna can be elevated on two 40-foot sectional masts. The lengths of the antenna elements can be preadjusted for best performance within the range of 1.5 to 20 mc. The swivel ground stake on which the masts are supported facilitates lowering of the antenna to make such changes.

d. The vertical antenna (fig. 7) can be erected by using Mast Sections AB–85/GRA–4, the whip sections, Insulator MX–384/GRA–4, and the associated supporting components. Two 55-foot high antennas may be erected from the components supplied with this equipment. The height of the vertical antenna is varied by changing the number of whip sections and/or the number of mast sections used.

4. Application of Equipment

Antenna Assembly AS–341/GR is designed for transmitting and receiving in conjunction with other communication center equipment; it can be used with any transmitter having a power output of less than 100 watts.

a. Mast Assembly. Mast Sections AB–85/GRA–4 can be raised to 40 feet or, with the use of the whip adapter and the whip mast sections, to 55 feet. The mast can be used as a vertical radiator or as a vertical support for the various horizontal antennas.

b. Horizontal Antenna. Reel Assemblies RL–122/GRA–4 and accessories are designed to facilitate setting up the various types of horizontal half-wave antennas for operation within the frequency range of 1.5 to 20 mc. The radio frequency cable assemblies and cable adapter provide a convenient low-loss transmission line from the antenna to the radio set.

5. Technical Characteristics of Antenna Assembly AS–341/GR

Frequency range	1.5 to 20 mc.
Weight (uncrated)	183 lb.
Antenna type	Horizontal wire or 55-foot vertical mast.

6. Packaging Data
(figs. 2 and 3)

a. Domestic Shipment. When packed for domestic shipment, each component of Antenna Assembly AS–341/GR is packaged individually. Each of the two carrying frames (figs. 2 and 4) is packed with 16 Mast Sections AB–85/GRA–4 and the associated guys, guy plates, and stakes. The antenna case (fig. 6) holds all the whip sections of the antenna. The bag (fig. 5) contains the cable assemblies, reels, halyards, counterpoises, and r-f cable assemblies. Each of the four containers is placed into a separate corrugated carton. The end plates of the frame are protected by corrugated caps. Corrugated fillers are inserted where necessary. Each carton then is sealed. The bag and the antenna case are placed in a nailed wooden box (fig. 3). The two carrying frames are placed in another nailed wooden box (fig. 2). The wooden boxes are secured by steel straps. Approximate sizes and weights of the two wooden boxes are as follows:

Number of crates	Height (in.)	Length (in.)	Width (in.)	Volume (cu ft)	Weight (lb)
1 of 2	13	42	28	8. 5	202
2 of 2	14	44	12	4. 2	83

Note.—Items may be packaged in a manner different from that shown, depending on supply channel.

b. Export Shipment. When packaged for export shipment, the same packing materials as given in *a* above are used. However, an additional wrapper, which is a waterproof barrier, must be used in export packaging. The four corrugated cartons are placed in this wrapper, which is sealed and then placed into the wooden boxes.

c. Packing List. The following list indicates the contents of each case. See the packing list attached to each case for exact content.

Crate dimensions (in.)	Contents	Notes
13 x 42 x 28	2 Frames MX–1116/GRA–4. The following components are packed within the frames: 8 Guy Plates MX–1470/U. 32 Mast Sections AB–85/GRA–4. 10 Guys MX–383/GRA–4. 8 Guys MX–382/GRA–4. 8 Guys MX–381/GRA–4. 2 Antenna Adapters MX–857/GRA–4. 8 Guy Stakes GP–111/G. 2 Insulators MX–384/GRA–4. 2 Hammers HM–1.	All connectors wrapped with greaseproof barrier.

Crate dimensions (in.)	Contents	Notes
14 x 44 x 12	1 Case including— 6 Mast Sections MS–116–A. 2 Mast Sections MS–117–A. 2 Mast Sections MS–118–A.	
	1 Bag including— 2 Radio Frequency Cable Assemblies CG–784/U. 4 Radio Frequency Cable Assemblies CG–789/U. 1 Radio Frequency Cable Adapter UG–1024/U. 3 Reel Assemblies RL–122/GRA–4. 1 Tape, steel. 8 Ground Rods GP–11. 2 Mast Bases AB–154/U. 4 Halyards MX–516/GRA–4. 2 Counterpoises CP–12. 2 Counterpoises CP–13.	Components are packed within the bag.

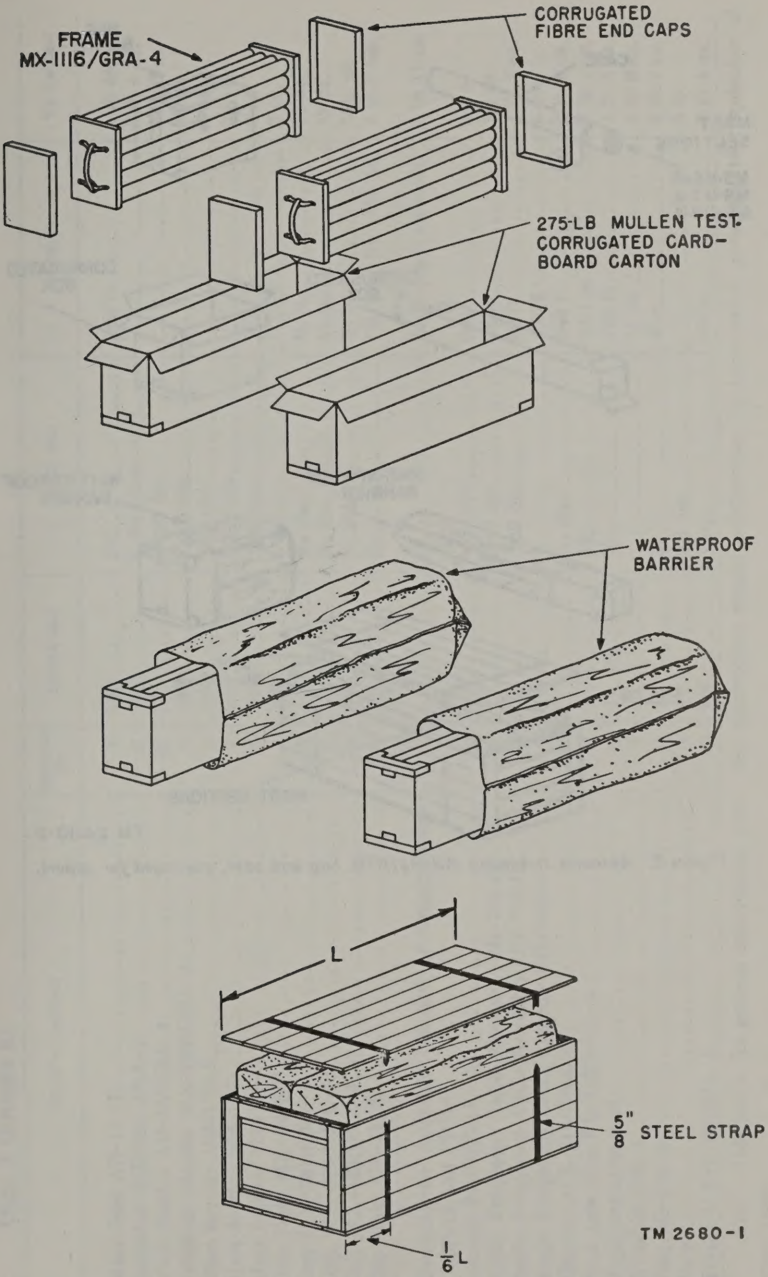
CORRUGATED FIBRE END CAPS
FRAME MX-1116/GRA-4
275-LB MULLEN TEST CORRUGATED CARDBOARD CARTON
WATERPROOF BARRIER
L
$\frac{5}{8}$" STEEL STRAP
TM 2680-1
$\frac{1}{6}$L

Figure 2. Antenna Assembly AS-341/GR, two frames, packaged for export.

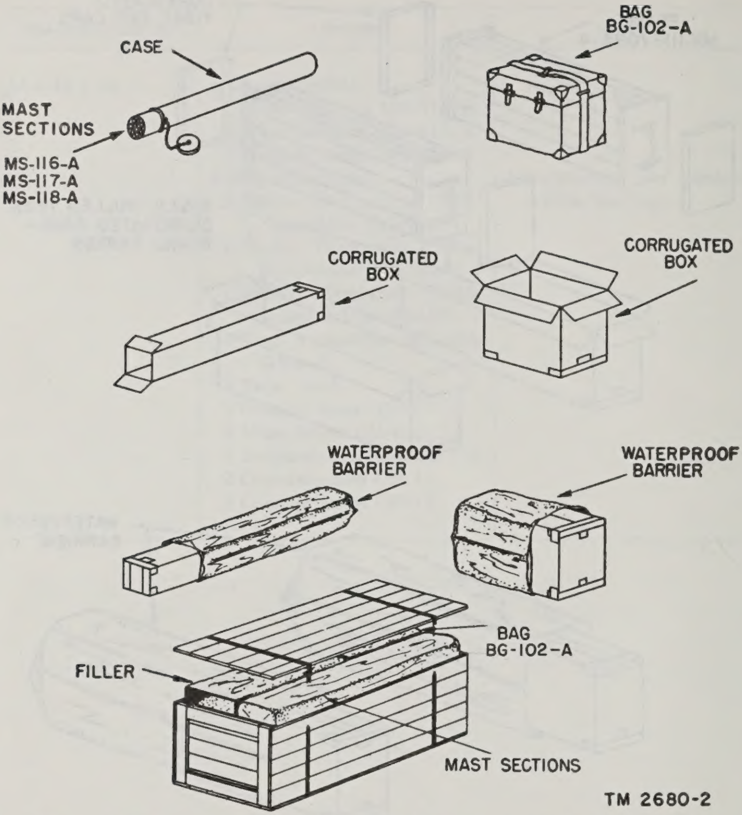

Figure 3. Antenna Assembly AS-341/GR, bag and case, packaged for export.

7. Weights and Dimensions of Components

(figs. 4 through 6)

List of components	Required No	Height (in.)	Depth (in.)	Length	Unit weight
Mast Base AB–154/U	2	16¾	1⅜	2 9/32 in	1 lb 5½ oz.
Insulator MX–384/GRA–4	2	16¾	3 dia (diameter)		3 lb 4 oz.
Mast Section AB–85/GRA–4	32	36	1.620 dia		2 lb 6 oz.
Antenna Adapter MX–857/GRA–4	2	10⅞	1.625 dia		11 oz.
Mast Section MS–116–A	6	39½	.393 dia		6 oz.
Mast Section MS–117–A	2	39½	.3360 dia		3½ oz.
Mast Section MS–118–A	2	39½	.215 dia		2 oz.
Guy Plate MX–1470/U	6	.093	3 dia		3 oz.
Guy MX–381/GRA–4	8		3/16 dia	40 ft	14 oz.
Guy MX–382/GRA–4	8		3/16 dia	31 ft	13 oz.
Guy MX–383/GRA–4	8		3/16 dia	50 ft	15½ oz.
Guy stake GP–111/G	8	20	3/16	1½ in. by 1½ in. angle.	1 lb 3 oz.
Counterpoise assembly (consists of Counterpoises CP–12 and CP–13).	2			25 ft (each element)	3 lb 11 oz.
Ground Rod GP–11	8		¼ (hex.)	9 in	2½ oz.
Radio Frequency Cable Assembly CG–784/U	2		.242 dia	28 in	1½ oz.
Radio Frequency Cable Assembly CG–789/U	4		.242 dia	50 ft	1 lb 7 oz.
Radio Frequency Cable Adapter UG–1024/U	1	3½	1	3.625 in	5 oz.
Halyard MX–516/GRA–4	2		3/16 dia	140 ft	2 lb 1 oz.
Reel Assembly RL–122/GRA–4	3	2⅞	4⅜	12½ in	2 lb 4 oz.
Tape; stainless steel	1	4½ dia	¾	100 ft	1 lb 5 oz.
Hammer HM–1	2			15 in	2 lb 9 oz.
Bag BG–102–A	1	14	14	9 in	3 lb 2 oz.
Case	1	41	2¼ dia		5 lb.
Frame MX–1116/GRA–4	2	8½	10½	40 in	7 lb 4 oz.

Note. This list is for general information only. See appropriate supply publications for information pertaining to requisition of spare parts.

8. Description of Antenna Assembly Components (figs. 4 through 6)

The components which comprise Antenna Assembly AS–341/GR are listed in paragraph 7.

a. Each Mast Section AB–85/GRA–4 is an aluminum tube 3 feet long. One end of the tube is smaller in diameter so that it can be fitted into the larger end of the next section; this reduces the effective length of each section to 2½ feet. A set of contact fingers is mounted in the larger end of each section to assure positive contact between sections when the mast is used as a vertical antenna.

b. Frame MX–1116/GRA–4 consists of two aluminum end plates 10½ inches high, 8⅜ inches wide, and ¼ inch thick. Each of these plates has 11 tube fittings which fit into the mast sections. When assembled with the mast sections for transportation, the end plates are held in place by a steel cable. A turnbuckle keeps the cable taut. Eleven of the mast sections form a trough in which two mast sections and other components of the antenna assembly can be packed. The other three mast sections fit into a rack and are strapped into place; this serves as the top of the case. A handle is provided at each end for carrying. A stud is provided on the frame above the rack. The strap must be inserted below the stud to prevent loosening of the strap.

c. Hammer HM–1 is supplied with the antenna assembly for driving guy stakes and ground rods into the ground.

d. Insulator MX–384/GRA–4 is a molded fiberglass insulator mounted between two aluminum tubes. The insulator fits at the junction of any two mast sections but normally is used at the base of the mast when the mast is used as a vertical radiator.

e. Antenna Adapter MX–857/GRA–4 is a 10⅞-inch aluminum tube fitted on one end with a set of contact fingers to fit over the top mast section. The other end forms a receptacle for the five-section whip antenna.

f. The whip sections of Antenna Assembly AS–341/GR consist of two Mast Sections MS–118–A, two Mast Sections MS–117–A, and six Mast Sections MS–116–A. From these components, two five-section whips may be assembled. Mast Section MS–116–A screws into the top of Antenna Adapter MX–857/GRA–4. Two more Mast Sections MS–116–A screw together and into the first section. Mast Section MS–117–A is screwed into the top of the upper Mast Section MS–116–A. Mast Section MS–118–A screws into Mast Section MS–117–A to complete the five-section whip.

g. The whip antenna case is used to store the 10 whip sections of the antenna. The case is constructed of aluminum tubing 41 inches long by 2¼ inches in diameter.

h. Mast Base AB–154/U is a steel ground stake with a pivoting clevis at one end. The upper portion of the clevis fits into the lower end of a mast section or the base insulator. The stake serves as the

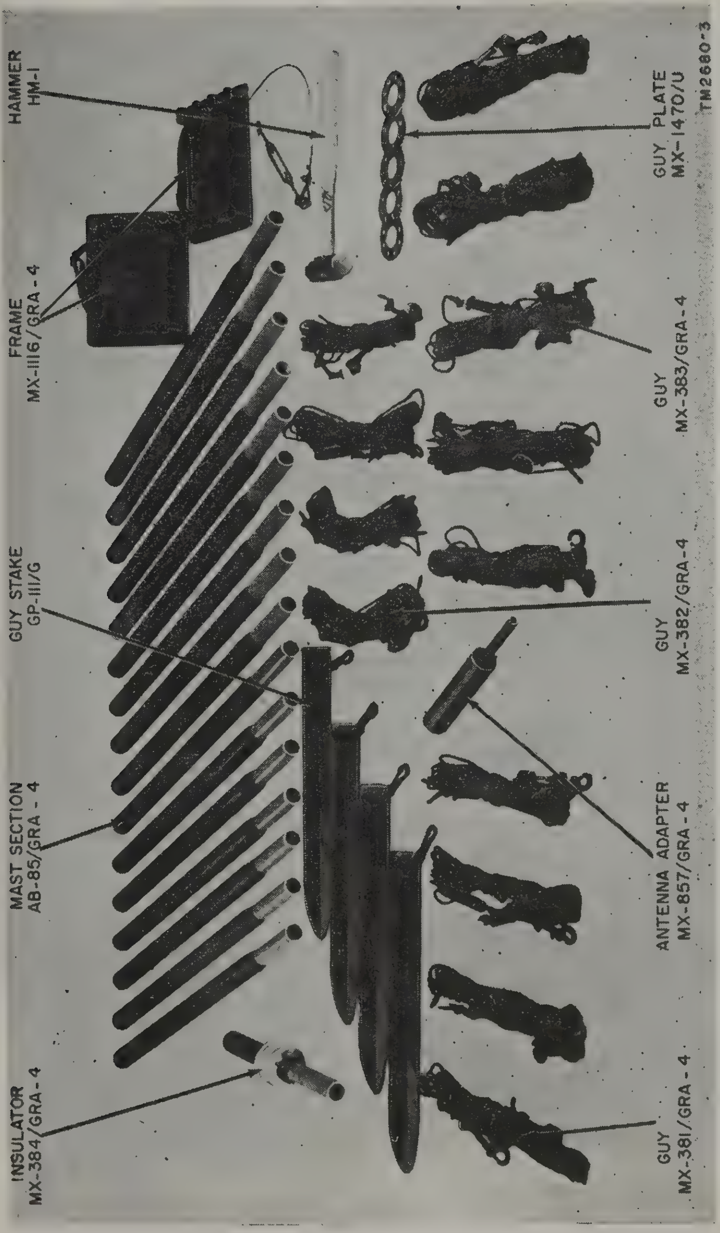

Figure 4. Antenna Assembly AS-341/GR, contents of Frame MX-1116/GRA-4.

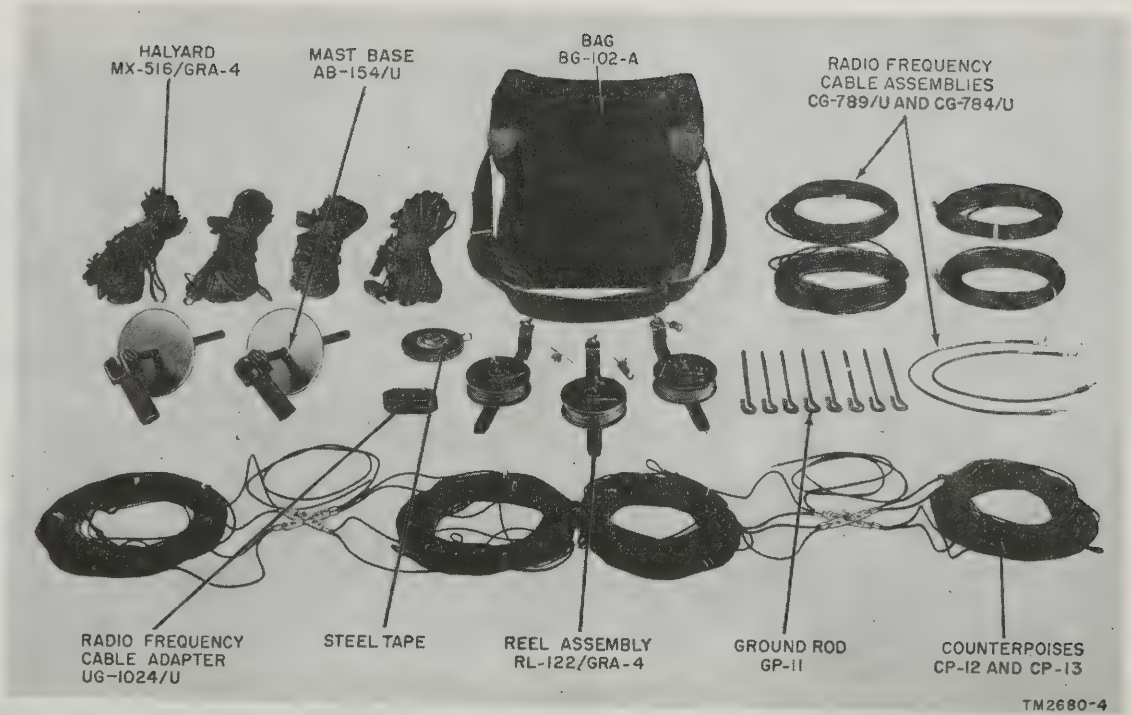

Figure 5. Antenna Assembly AS-341/GR, contents of Bag BG-102-A.

base of the mast structure and maintains a fixed position in the ground. A 6-inch diameter base plate prevents the swivel joints from becoming imbedded in the ground.

i. Guy Stake GP–111/G is constructed of steel and is 20 inches long. A guy fastener which is attached to the top of the stake fastens to the guys.

j. Guys MX–381/GRA–4, MX–382/GRA–4, and MX–383/GRA–4 are similar in design; the only differences are in the color coding (black, blue, and red, respectively) and in the length (40 feet, 31 feet, and 50 feet, respectively). They are made of 3/16-inch, three-strand twist nylon rope. One end is provided with a length-adjustment Fastener FT–9; a snap hook and strain insulator are attached to the other end.

k. Guy Plate MX–1470/U is a round steel plate, 3 inches in diameter and 0.093 inch thick. The center hole fits over the male end of a mast section, and five of the outer holes serve for attaching the four guy ropes and a halyard.

l. Halyard MX–516/GRA–4 consists of a 140-foot length of 3/16-inch, three-strand twist nylon rope. One end of the rope is fitted with an insulator and a fastener which attaches to Reel Assembly RL–122/GRA–4 or directly to the antenna wire. A pulley which floats on the halyard attaches to the top guy plate with a snap hook. The other end of the rope is free.

m. Ground Rod GP–11 is a 9-inch long, 1/4-inch hexagonal, steel rod. One end of the rod has an eye and terminal screw; the other end is tapered to permit its being driven into the ground. The function of this ground pin is to provide an anchoring terminal for each counterpoise element.

n. The counterpoise assembly, consisting of counterpoises CP–12 and CP–13, forms an eight element ground system when the mast is used as a vertical antenna. Counterpoise CP–12 consists of a center plate, four 25-foot radials, and a lead-in wire. It is placed at the base of the mast and the radials are fastened to the terminals on Ground Rods GP–11. Counterpoise CP–13 consists of a slotted center plate which fastens to the center plate of Counterpoise CP–12 by means of a binding post and a wingnut. Four 25-foot radials attach to the center plate. The other ends of the radial wires attach to the terminals of Ground Rods GP–11.

o. Bag BG–102–A measures 14 inches high, 14 inches long, and 9 inches deep. It is constructed of heavy canvas and is reinforced at the corners with leather. A single shoulder strap is provided for carrying it. The bag serves as a storage case and carryall for some of the components of the antenna assembly. When packed, the bag weighs approximately 37½ pounds.

p. Reel Assembly RL–122/GRA–4 consists of a reel and 150 feet of Wire W–120. Each end of the wire is equipped with a mating termination so that the wires from any number of reels can be combined to

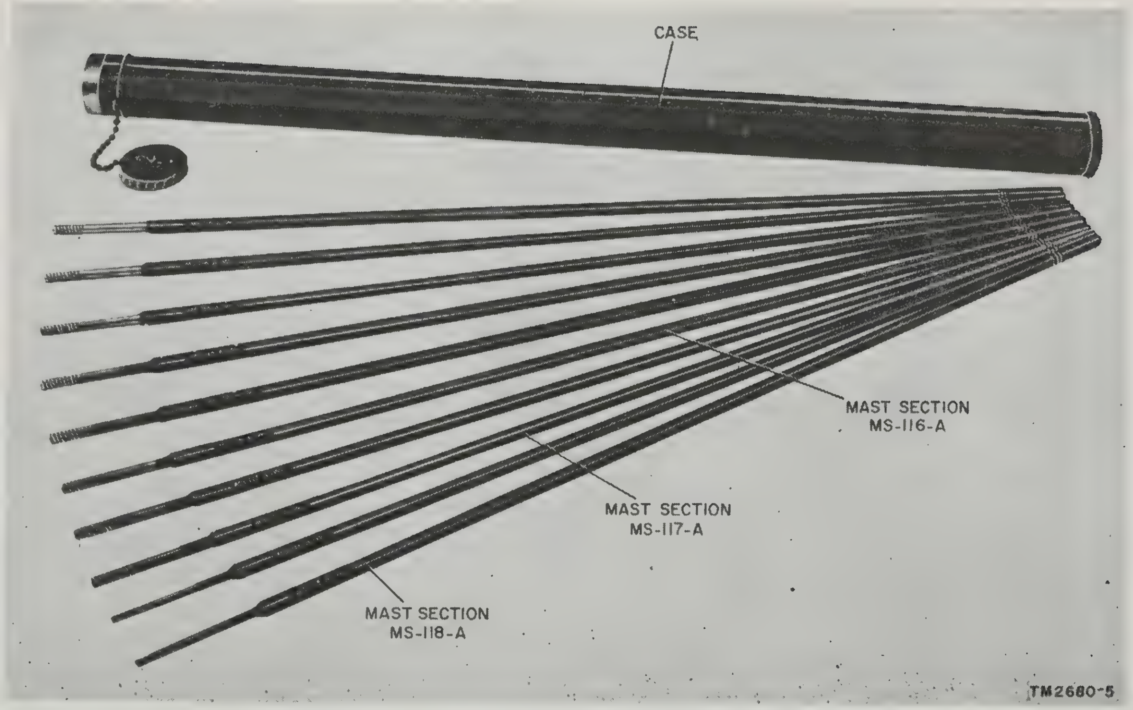

Figure 6. Antenna Assembly AS–341/GR, contents of whip antenna case.

make longer antennas. Two small holes are provided in the reel handle for the connection of Halyard MX-516/GRA-4.

q. Radio Frequency Cable Adapter UG-1024/U is made of laminated phenol, and has two terminals for connection of Wire W-120 (antenna wire) and a female coaxial fitting for connection of Radio Frequency Cable Assembly CG-789/U. This insulator is used with the horizontal antennas.

r. The stainless steel measuring tape is 100 feet long and is divided into feet and tenths of a foot. It is used when determining the length of antenna necessary for operation at a given frequency.

s. Radio Frequency Cable Assembly CG-789/U consists of 50 feet of Radio Frequency Cable RG-59A/U having a nominal impedance of 73 ohms. The cable is terminated at one end by Jack UG-262/U and at the other end by Plug UG-260/U.

t. Radio Frequency Cable Assembly CG-784/U consists of 2 feet of Radio Frequency Cable RG-59/U having a nominal impedance of 73 ohms. The cable is terminated at one end by Plug UG-260/U and at the other end by a solderless connector. This cable assembly is used with the vertical antenna. The solderless connector fits into the binding post on Insulator MX-384/GRA-4. The other end plugs into the jack on Radio Frequency Cable Assembly CG-789/U which feeds the receiver.

9. Running Spares

The following spares are supplied with Antenna Assembly AS-341/GR:

2 Guys MX-383/GRA-4 (red, 50 feet).
2 Guy Plates MX-1470/U.
2 Halyards MX-516/GRA-4.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

10. Selecting Type of Antenna

a. General. When choosing the antenna to be used, the basic concepts of good military radio communications as well·as the operating characteristics of each type of antenna should be taken into account. Table I summarizes the characteristics of each antenna.

b. Vertical Antennas. A vertical antenna (fig. 7) can be used for both transmitting and receiving at distances which depend on the terrain, frequency, and power input to the antenna. Over open terrain, reliable communication may be expected up to 30 miles if sufficient power is used. Communication depends on ground waves Antenna Assembly AS–341/GR can be used to make two vertical antennas not exceeding 55 feet in height. The vertical antenna should be located within 100 feet of the equipment.

c. Horizontal Antennas. In areas such as jungles, where vegetation is very dense, vertical antennas are not useful because all of the ground wave is absorbed by the surrounding growth. This necessitates the use of a horizontal antenna and sky wave communication. The specific type of horizontal antenna to be used is determined by the conditions of terrain and the frequency of the associated equipment. The various types of horizontal antenna which can be made up from Antenna Assembly AS–341/GR, and the characteristics of each, are discussed below.

(1) *Slanting wire antenna.* If the station is located in a clearing, a slanting wire can be used as an antenna by attaching one end to the 40-foot mast or to a tall tree (fig. 8). If the operating frequency is relatively low, a comparatively long antenna must be used. (Frequencies lower than 3.1 mc require the use of two reel assemblies.) Since a slanting wire antenna longer than 100 feet introduces excessive sag, height will be sacrificed. Therefore, it is adivsable to use this antenna with operating frequencies not less than 4.5 mc.

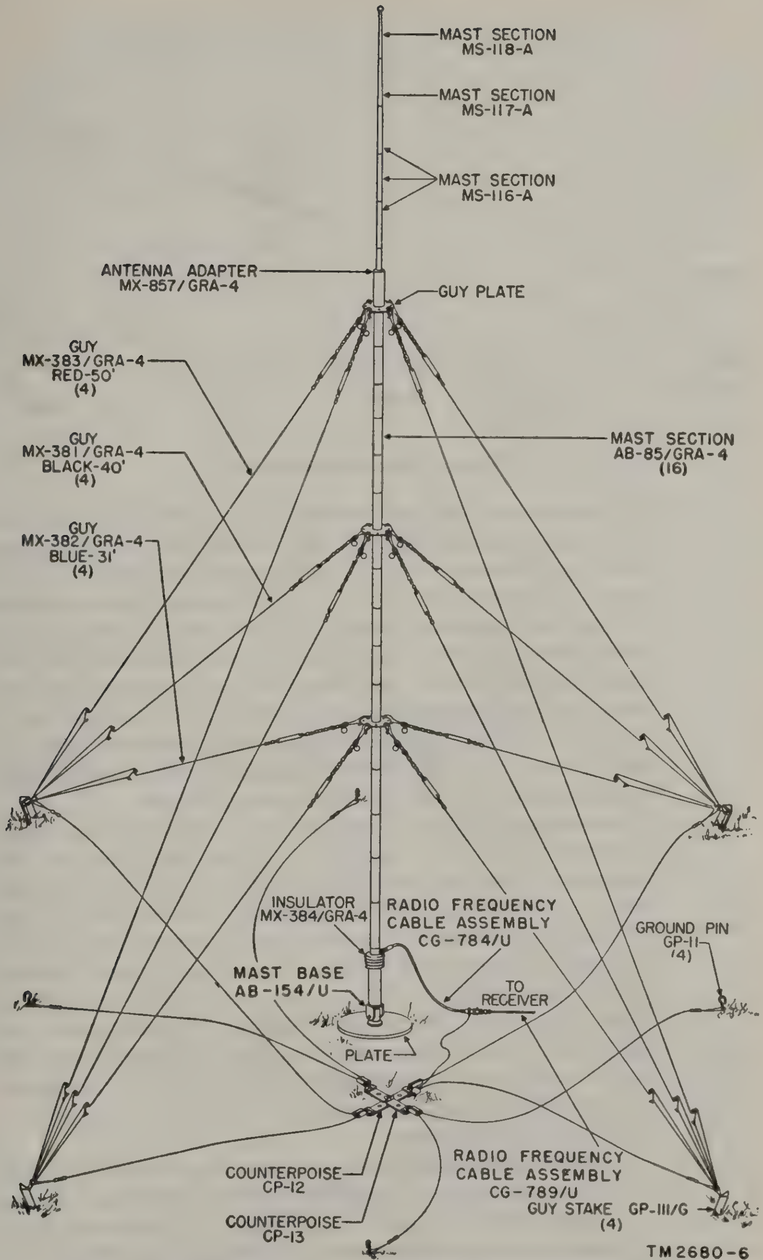
MAST SECTION MS-118-A
MAST SECTION MS-117-A
MAST SECTION MS-116-A
ANTENNA ADAPTER MX-857/GRA-4
GUY PLATE
GUY MX-383/GRA-4 RED-50' (4)
GUY MX-381/GRA-4 BLACK-40' (4)
MAST SECTION AB-85/GRA-4 (16)
GUY MX-382/GRA-4 BLUE-31' (4)
INSULATOR MX-384/GRA-4
RADIO FREQUENCY CABLE ASSEMBLY CG-784/U
GROUND PIN GP-11 (4)
MAST BASE AB-154/U
TO RECEIVER
PLATE
RADIO FREQUENCY CABLE ASSEMBLY CG-789/U
COUNTERPOISE CP-12
GUY STAKE GP-111/G (4)
COUNTERPOISE CP-13
TM2680-6

Figure 7. Antenna Assembly AS-341/GR, installed as vertical antenna.

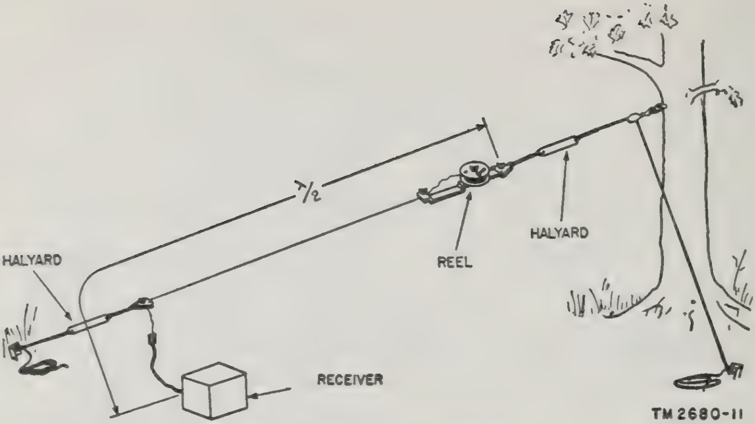

Figure 8. Slanting wire antenna.

(2) *L-type antenna.* If the radio station is located in a clearing, the L-type antenna (fig. 9) can be used with two masts, or with one mast and a structural member (or tree) as a support. The L-type antenna is most efficient when installed so that the horizontal portion is ½ wavelength long and the down lead is ¼ wavelength long. Since the mast is 40 feet high and the vertical portion should be as straight as possible, the antenna operates most efficiently at a frequency of 5.8 mc. At all other frequencies, a compromise must be made. At frequencies lower than 3.1 mc, two reel assemblies must be used to make up the necessary length.

(3) *Off-center-fed Hertz antenna.* If the station is located in a clearing where masts can be set up on each side, the off-center-fed Hertz antenna (fig. 10) can be used to advantage. The lead-in wire should be vertical; its length should not exceed the length of the antenna, and it never should exceed 100 feet. This type of antenna can be used on all frequencies between 1.5 and 20 mc. The lead-in wire must be attached at a point .361 x ½ wavelength from one end of the antenna. This antenna uses a single wire transmission line and depends on the ground for a return circuit. Therefore, good conducting ground is essential.

(4) *Center-fed Hertz antenna.*

(*a*) If the station is concealed, but a clearing exists within 150 feet, the center-fed Hertz (doublet) antenna (fig. 11) can be used with two masts as supports. The coaxial cable which serves as a feed should be routed at a 90° angle to the antenna and should be kept to a minimum length.

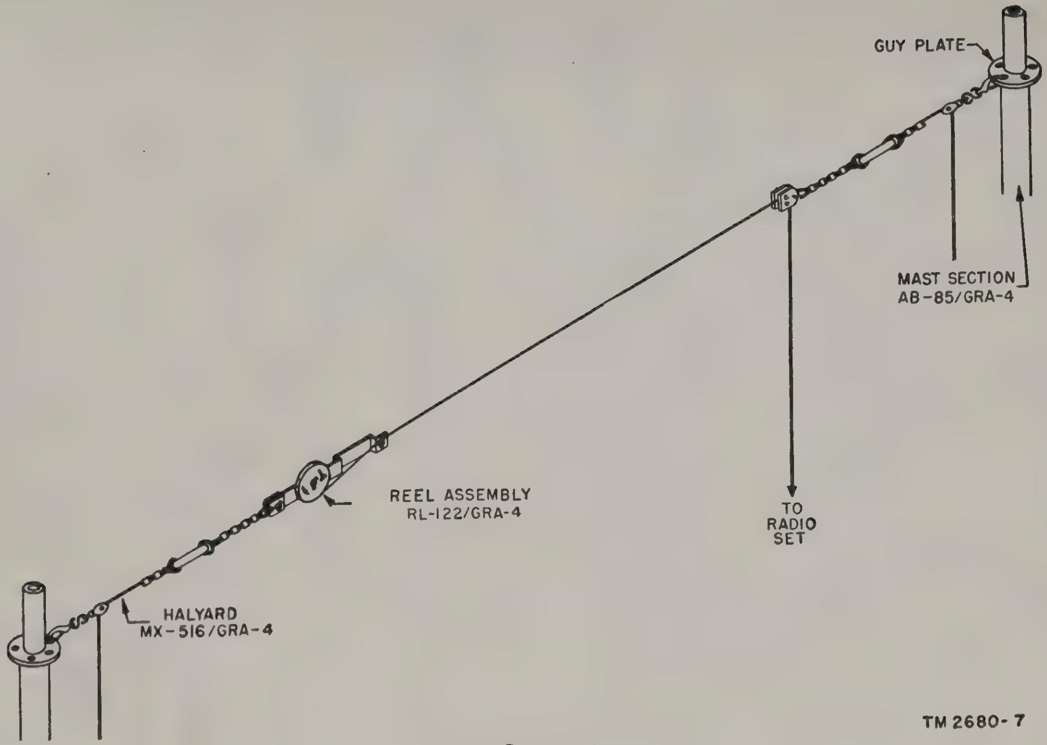

Figure 9. L-type antenna.

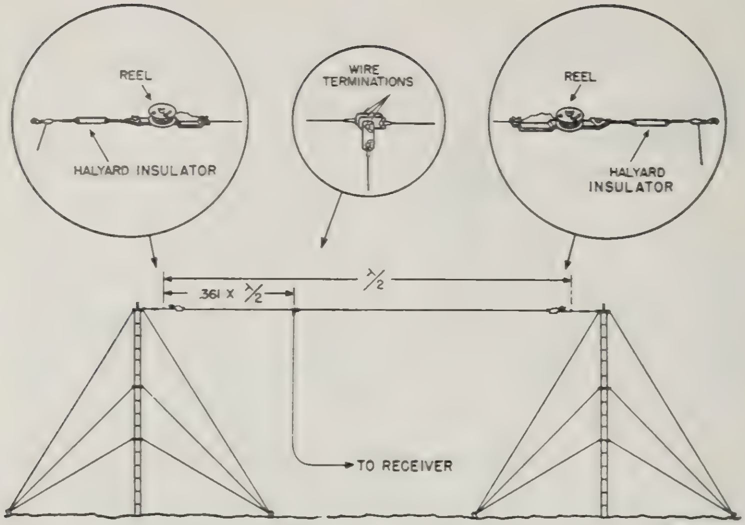

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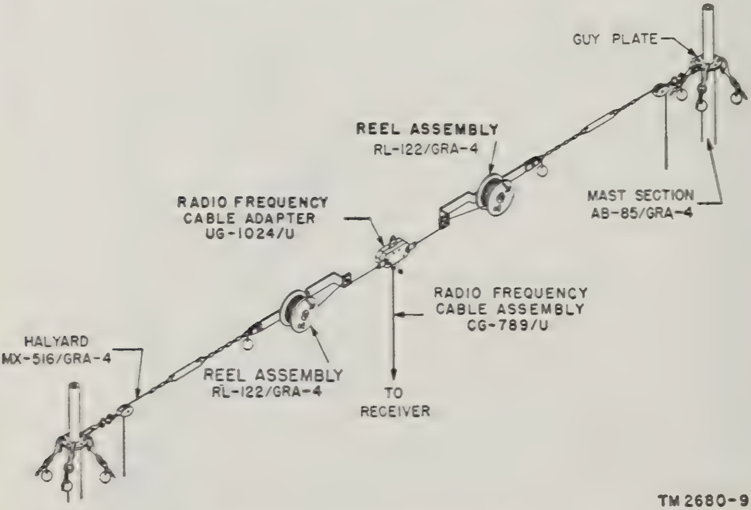
Figure 10. Off-center-fed Hertz antenna.


GUY PLATE
REEL ASSEMBLY RL-122/GRA-4
RADIO FREQUENCY CABLE ADAPTER UG-1024/U
MAST SECTION AB-85/GRA-4
RADIO FREQUENCY CABLE ASSEMBLY CG-789/U
HALYARD MX-516/GRA-4
REEL ASSEMBLY RL-122/GRA-4
TO RECEIVER

TM 2680-9

Figure 11. Center-fed Hertz antenna.

(*b*) The center-fed Hertz antenna is ½ wavelength long and is fed at the center. It can be used on frequencies from 1.5 to 20 mc.

(*c*) When using 100 feet of coaxial cable, the cable lying on good conducting ground is subject to leakage. Since received signals are much weaker than transmitted signals, and since they may be further attenuated in the antenna and transmission line circuits, it is advantageous to erect the receiving antenna as near to the receiver as possible.

11. Siting

a. General. When choosing a location for setting up the mast and/or antenna, the conditions given in table I first should be considered. Location of the distant station also should be considered. When communicating with two or more distant stations, the antenna should be located in a position favorable to the station most difficult to receive.

b. Vertical Antennas. The ideal location for erecting a vertical antenna is the center of a plateau having no natural or artificial obstructions nearby. When possible, select a spot of ground that will provide a firm base for the stakes.

c. Horizontal Antennas. If the location of the communication center is not suitable for a vertical antenna, a horizontal antenna may be used. It should be located in a clearing, and its direction should be determined by the orientation at which it takes fullest advantage of its radiation pattern. Since the radiation pattern of the half-wave antenna is broadside to the wire, the antenna should be erected with the wire broadside to the distant station. When two or more stations are to be considered, orient the antenna so that the broadside of the wire faces the station most difficult to receive. It should be noted that both location and orientation should be determined by the distant stations whenever possible. If, after erecting an antenna system, the reception is not satisfactory, a different antenna configuration should be tried.

12. Uncrating, Unpacking, and Checking New Equipment

a. General. The components of Antenna Assembly AS–341/GR are packaged as illustrated in figures 2 and 3.

Caution: Be careful when uncrating, unpacking, and handling the equipment. If it becomes damaged, extensive repair or even replacement may be required.

b. Uncrating Equipment (figs. 2 and 3). When unpacking the equipment, proceed as follows:

(1) Cut the steel straps and remove the nails from the top of the wooden boxes with a nail puller. Remove the cover.

(2) Remove the corrugated cartons from the box.

Note. If the equipment is packed for export, the sealed waterproof barrier which lines the cartons should be cut open, but not damaged unnecessarily. This barrier can be used for repacking.

(3) Cut the seals of the corrugated boxes and remove the contents.

Table I. *Characteristics of Various Antenna Arrangements*

Antenna type	Type of support	Recommended frequency (mc)	General characteristics	Space requirements
Vertical type	Guys	1. 5–20	Omnidirectional primarily for ground-wave reception.	50-foot diameter clear area.
Slanting wire type	Mast or tree	1. 5–20	Sky wave and ground wave reception, directional broadside to wire.	Length of antenna plus 50-foot minimum.
L type	2 masts or 1 mast and structure.	1. 5–5. 8	Directional broadside to top of antenna for sky wave, omnidirectional for ground wave.	Length of horizontal portion of antenna plus 50-foot minimum.
Off-center-fed Hertz type	2 masts	1. 5–20	Primarily sky wave, directional. Broadside to antenna.	Antenna length plus 50-foot minimum.
Center-fed Hertz type	2 masts	1. 5–20	Directional, broadside to antenna.	Antenna length plus 50-foot minimum.

(4) When unpacking the mast assembly, proceed as follows:

(*a*) Unfasten the two straps at the top of the unit and remove the three mast sections which rest in the racks on the end plates.

(*b*) Remove all guys, stakes, etc., from inside the frame.

(*c*) Loosen and unhook the turnbuckle and cable which hold the end plates together.

(*d*) Remove the end plates to free the remaining mast sections.

(5) Some components of the antenna are packed in a canvas bag (fig. 5). To unpack, open the bag and remove the instruction book and components.

c. Checking. Check the component parts against the packing lists included with the equipment. If any discrepancy is found, refer to paragraph 6.

13. Determining Length of Antenna

a. Table II lists the different lengths of antenna to be used with various frequencies. Refer to paragraph 34 for a discussion of the theory related to length of antenna.

b. The points of measurement for the various types of horizontal antennas are as follows:

Type	Measure
Slanting wire	From junction of reel and halyard to radio set binding post.
L-type, off-center-fed Hertz, center-fed Hertz.	From one halyard fastener to other halyard fastener.

Table II. Half-Wave Antenna Length Chart

Freq (mc)	Length (ft)	Freq (mc)	Length (ft)	Freq (mc)	Length (ft)
1.5	311.0	3.0	155.7	4.5	103.8
1.6	291.9	3.1	152.2	4.6	101.5
1.7	274.7	3.2	145.9	4.7	99.4
1.8	259.4	3.3	141.5	4.8	97.3
1.9	245.8	3.4	137.3	4.9	95.3
2.0	233.5	3.5	133.4	5.0	93.4
2.1	222.4	3.6	129.7	5.1	91.6
2.2	212.3	3.7	126.2	5.2	89.8
2.3	203.0	3.8	122.9	5.3	88.1
2.4	194.6	3.9	119.7	5.4	86.5
2.5	186.8	4.0	116.8	5.5	84.9
2.6	179.6	4.1	113.9	5.6	83.4
2.7	173.0	4.2	111.2	5.7	81.9
2.8	166.8	4.3	108.6	5.8	80.5
2.9	161.0	4.4	106.1	5.9	79.2

Table II. Half-Wave Antenna Length Chart—Continued

Freq (mc)	Length (ft)	Freq (mc)	Length (ft)	Freq (mc)	Length (ft)
6.0	77. 8	10.7	43. 6	15.4	30. 3
6.1	76. 8	10.8	43. 2	15.5	30. 1
6.2	75. 3	10.9	42. 8	15.6	29. 9
6.3	74. 1	11.0	42. 5	15.7	29. 7
6.4	73. 0	11.1	42. 1	15.8	29. 6
6.5	71. 8	11.2	41. 7	15.9	29. 4
6.6	70. 8	11.3	41. 4	16.0	29. 2
6.7	69. 7	11.4	41. 0	16.1	29. 0
6.8	68. 7	11.5	40. 6	16.2	28. 8
6.9	67. 7	11.6	40. 3	16.3	28. 6
7.0	66. 7	11.7	39. 9	16.4	28. 5
7.1	65. 8	11.8	39. 6	16.5	28. 3
7.2	64. 9	11.9	39. 2	16.6	28. 1
7.3	64. 0	12.0	38. 9	16.7	28. 0
7.4	63. 1	12.1	38. 6	16.8	27. 8
7.5	62. 3	12.2	38. 3	16.9	27. 6
7.6	61. 5	12.3	38. 0	17.0	27. 5
7.7	60. 7	12.4	37. 7	17.1	27. 3
7.8	59. 9	12.5	37. 4	17.2	27. 1
7.9	59. 1	12.6	37. 1	17.3	27. 0
8.0	58. 4	12.7	36. 8	17.4	26. 8
8.1	57. 7	12.8	36. 5	17.5	26. 6
8.2	57. 0	12.9	36. 2	17.6	26. 5
8.3	56. 3	13.0	35. 9	17.7	26. 4
8.4	55. 6	13.1	35. 6	17.8	26. 2
8.5	54. 9	13.2	35. 4	17.9	26. 0
8.6	54. 3	13.3	35. 1	18.0	25. 9
8.7	53. 7	13.4	34. 8	18.1	25. 8
8.8	53. 1	13.5	34. 6	18.2	25. 6
8.9	52. 5	13.6	34. 3	18.3	25. 5
9.0	51. 9	13.7	34. 1	18.4	25. 4
9.1	51. 3	13.8	33. 8	18.5	25. 2
9.2	50. 8	13.9	33. 6	18.6	25. 1
9.3	50. 2	14.0	33. 4	18.7	24. 9
9.4	49. 7	14.1	33. 1	18.8	24. 8
9.5	49. 2	14.2	32. 9	18.9	24. 7
9.6	48. 7	14.3	32. 7	19.0	24. 5
9.7	48. 2	14.4	32. 4	19.1	24. 4
9.8	47. 7	14.5	32. 2	19.2	24. 3
9.9	47. 2	14.6	32. 0	19.3	24. 2
10.0	46. 7	14.7	31. 8	19.4	24. 0
10.1	46. 2	14.8	31. 6	19.5	23. 9
10.2	45. 8	14.9	31. 3	19.6	23. 8
10.3	45. 3	15.0	31. 1	19.7	23. 7
10.4	44. 9	15.1	30. 9	19.8	23. 5
10.5	44. 4	15.2	30. 7	19.9	23. 4
10.6	44. 1	15.3	30. 5	20.0	23. 3

14. Installation of Antenna

a. Slanting Wire Antenna (fig. 8). The slanting wire antenna is usually ½ wavelength long. Refer to paragraphs 10*c*(1) and 11 for information on locating and siting the antenna and to paragraph 13 to obtain the proper length. When measuring, be sure to start at the transmitter, or receiver, binding post and include the lead-in wire. After the direction and location of the antenna have been chosen (pars. 10 and 11), set up the antenna as follows:

(1) If the 40-foot mast is to be used as the support, erect it about ½ wavelength from the transmitter or receiver (pars. 15 and 16). Fasten the halyard to the top guy plate before raising the mast.

(2) If a tree or similar support is used, first attach the pulley on the halyard to the support at the desired height. Locate the transmitter or receiver approximately ½ wavelength from the support.

(3) Fasten the antenna wire termination to the lead-in wire. Connect the lead-in wire to the radio set.

(4) Fasten the insulator end of a second halyard to the antenna wire (fig. 12) about 6 inches from the end of the antenna wire and secure the halyard to a stake. Adjust the halyard to take all the strain of holding the antenna wire tight. Allow the lead-in wire to sag, but do not allow it to touch the ground at any point.

(5) Unwind the wire of the antenna reel as follows (fig. 13):

(*a*) Grasp the reel firmly in one hand and loosen the thumbnut at the center of the reel and on the wire clamp.

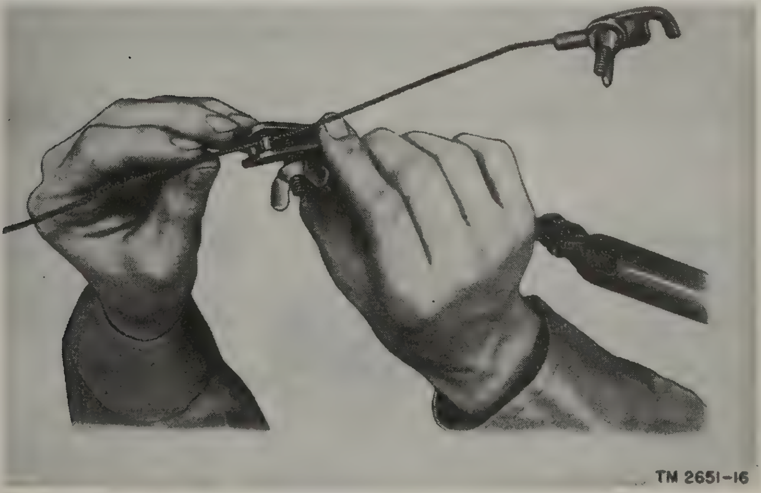


Figure 12. Attaching halyard to antenna wire.

(*b*) Remove the wire from the wire clamp.

(*c*) Walk slowly away from the receiver, keeping the wire taut at all times. Hold the thumb on the wire to prevent backlash.

(6) Use the tape and measure the proper length of wire (table II).

Note. The tape should be wiped off after use to prevent dirt and sand from entering and clogging the reeling mechanism.

(7) Replace the wire in the wire clamp and tighten the thumbnut.

(8) Tighten the thumbnut at the center of the reel.

(9) Attach the insulator end of the other halyard to the reel (fig. 14).

(10) Pull the free end of this halyard to raise the antenna, and secure the halyard to a guy stake.

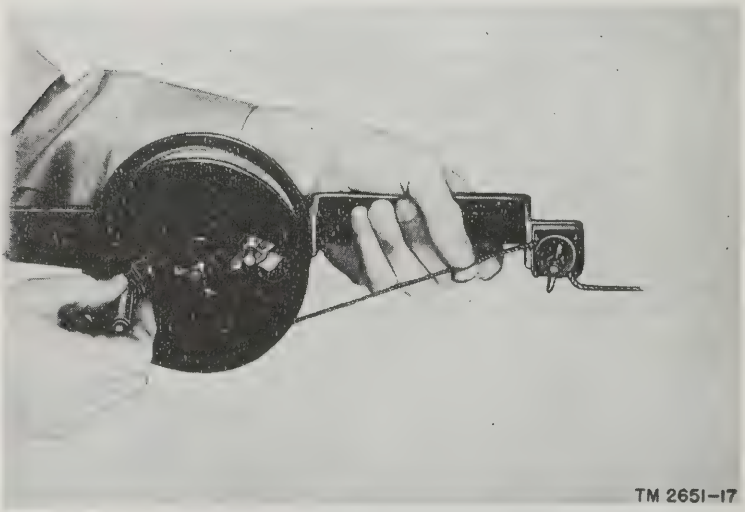


Figure 13. Unwinding antenna wire from reel.

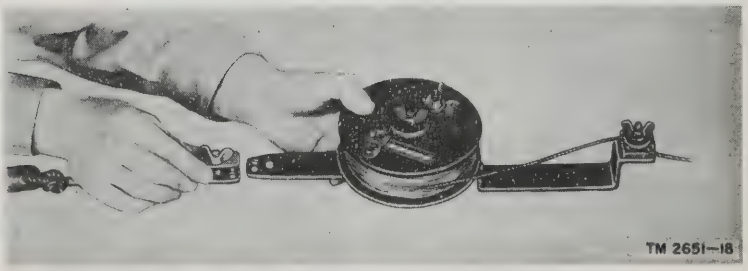


Figure 14. Attaching halyard to reel.

b. L-Type Antenna (fig. 9). As discussed in paragraph 10*c*(2), the L-type antenna operates most efficiently at 5.8 mc, because it has a down lead of 40 feet and the horizontal portion of the antenna is equal to 80 feet. Refer to paragraph 11 for siting, and refer to paragraph 13 to obtain the required length. The L-type antenna is not recommended for use on frequencies higher than 5.8 mc. For frequencies above 3.1 mc, one antenna reel is used. For frequencies lower than 3.1 mc, remove the wire from one reel and connect it in series with the wire on a second reel to make up the required length (fig. 15). After the direction and location of the antenna have been chosen (pars. 10 and 11), set up the antenna as follows:

(1) Locate the two 40-foot masts (or one mast and a similar support) ½ wavelength plus 20 feet apart, and assemble and erect the mast or masts (pars. 15 and 16).

(2) Fasten the pulley of a halyard at a height of 40 feet to the similar support, if used.

(3) Fasten the antenna wire termination to the lead-in wire. Connect the lead-in wire to the radio set.

(4) Starting at the end of the lead-in wire, measure and unwind (par. 14*a*(5)) 40 feet of wire for the down lead. At this point, attach the fastener on the rear halyard insulator to the antenna wire (fig. 12).

(5) Unwind the antenna wire until the length from one halyard fastener to the other is ½ wavelength (par. 13). If necessary, use the wire from two reels by removing the wire from one reel and attaching it to the wire on a second reel (fig. 15).

(6) Place the wire in the wire clamp and tighten the thumbnut of the clamp and the nut at the center of the reel.

(7) Fasten the remaining halyard insulator to the reel (fig. 14).

(8) Raise the antenna by pulling the free end of each halyard until the antenna wire is taut. Tie each halyard to a guy stake or other device.

c. Off-Center-Fed Hertz Antenna (fig. 10). The off-center-fed Hertz antenna is a half-wave antenna which uses a single wire feeder. The impedance of a single wire feeder is approximately 500 ohms. The feeder should be connected to the antenna at a 500-ohm point. This point can be found by multiplying the antenna length (par. 13) by .361. The result is the number of feet from either end of the antenna to this point where the feeder should be connected. Refer to table I for siting.

(1) Locate the two 40-foot masts ½ wavelength plus 20 feet apart; assemble and erect the masts with halyards (pars. 15 and 16).

(2) Fasten the wire terminations of three antenna reels together (fig. 16). Two of the wires serve as the antenna, and the third serves as the feeder.

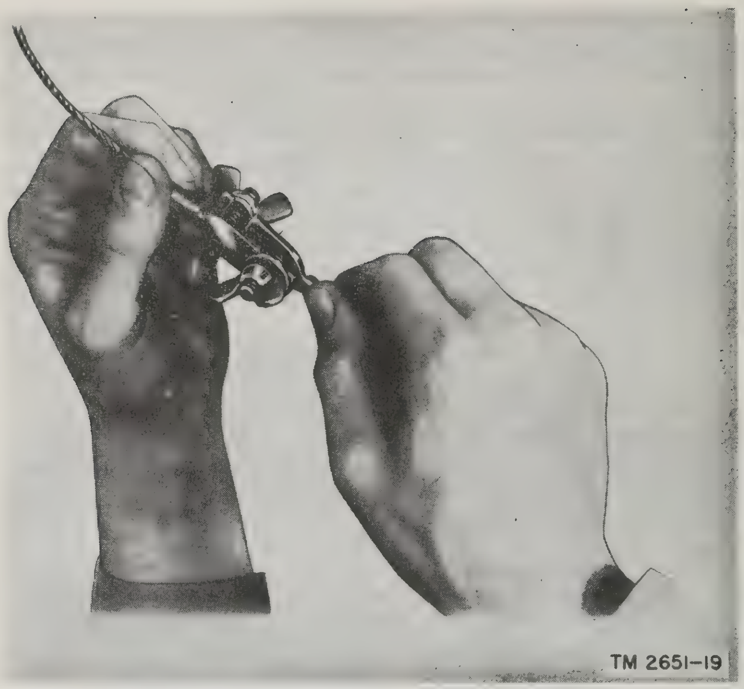


Figure 15. Connecting wire from two reel assemblies.

(3) Unwind and measure one wire to obtain the length to the 500-ohm point (see *c* above). This is the shorter side of the antenna.

(4) Unwind the second wire until the length of the first wire plus the second wire equals ½ wavelength (par. 13).

(5) Unwind 40 feet of wire from the third reel.

(6) Place each wire in its corresponding wire clamp and tighten the wire clamp thumbnuts; tighten the thumbnut at the center of each reel.

(7) Fasten the first and second reels to the insulator end of the respective mast halyards (fig. 14).

(8) Pull the free end of each halyard until the antenna is raised. Secure each halyard to the guy fastener at one of the stakes.

(9) Fasten the insulator end of a third halyard to the third reel and secure the halyard to a stake in the ground. Adjust the length of the feeder to remove all slack.

(10) Fasten one end of the lead-in wire under the thumbnut on the reel wire clamp. Connect the other end to the transmitter or receiver binding post.

d. Center-Fed Hertz (Doublet) Antenna (fig. 11). The center-fed Hertz (doublet) antenna is a half-wave antenna fed at the center by means of a coaxial cable of 72 ohms impedance. Refer to table I for siting. Then set up the antenna as follows:

(1) Locate the two 40-foot masts ½ wavelength plus 20 feet apart; assemble and erect each mast with halyards (pars. 15 and 16).

(2) Connect the wire terminations of the two reel assemblies to Radio Frequency Cable Adapter UG–1024/U by means of the thumbnuts on the insulator (fig. 17)

(3) Attach Radio Frequency Cable Assembly CG–789/U to the coaxial connector in the r-f cable adapter.

(4) Unwind and measure each antenna wire to a length equal to slightly less than one-half the value obtained from table II.

(5) Check the overall length of the two wires plus the insulator. Adjust them to the lengths given in table II, being sure to keep the cable adapter centered.

(6) Attach each reel to the insulator of the respective mast halyard (fig. 14).

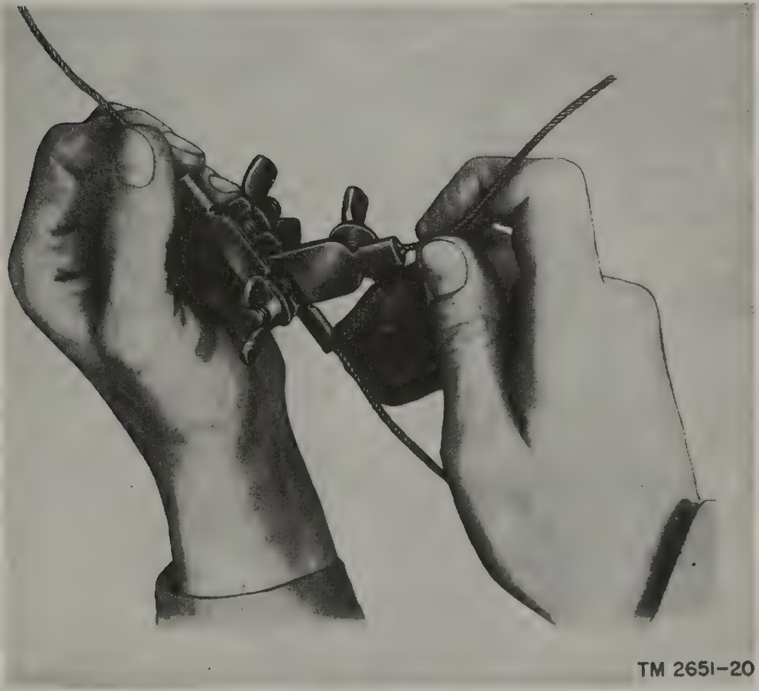


Figure 16. Connecting wire from three reel asemblies.

(7) Raise the antenna by pulling the free end of each halyard. Secure each halyard to the guy fastener of a ground stake.

e. Vertical Antenna. The vertical antenna (fig. 7) must approximate ¼ wavelength as closely as possible; otherwise, tuning of the antenna is necessary (par. 36). Since the values given in table II (par. 13) are for half-wavelengths, they must be divided in half to obtain the correct ¼ wavelength for a given frequency. The length of the vertical antenna is measured from the tip to the insulator at the base. The antenna is erected as follows:

(1) Locate the ½ wavelength for the desired operating frequency (table II). Divide this value in half and obtain the ¼ wavelength or mast height.

(2) Erect the mast and whip as directed in paragraph 15. The complete 55-foot mast must be used for all frequencies of 4.2 mc and lower. For frequencies above 4.2 mc, the mast height may be varied by leaving out one or more whip sections, or one or more Mast Sections AB–85/GRA–4. Insulator MX–384/GRA–4 must be installed at the base of

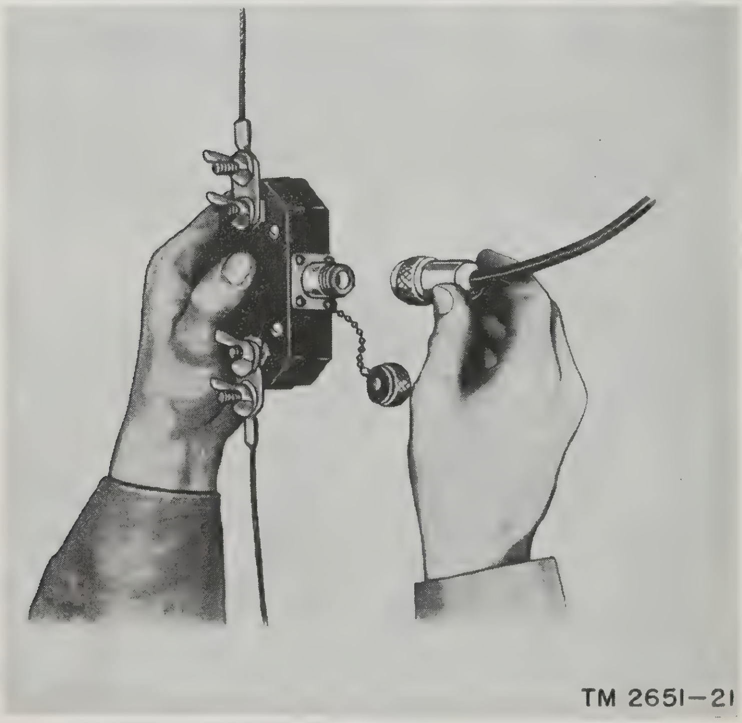

TM 2651–21

Figure 17. Connections to Radio Frequency Cable Adapter UG–1024/U.

the mast. If the complete mast is to be used on all frequencies, an antenna tuning unit may be required.

(3) Connect the solderless connector on Radio Frequency Cable Assembly CG–784/U to the binding post on the base insulator at the foot of the mast.

(4) Connect one end of Radio Frequency Cable Assembly CG–789/U to the coaxial connector on Radio Frequency Cable Assembly CG–784/U and the other end to the coaxial antenna connector on the radio set.

(5) Fasten Counterpoises CP–12 and CP–13 together at the center, using the binding post and thumbscrew on Counterpoise CP–13. Place the assembly on the ground at the foot of the antenna mast as shown in figure 7. Drive the four Ground Pins GP–11 into the ground at positions about halfway between adjacent guy stakes. Fasten the tips of the four radial leads of one counterpoise to the terminal screws of the four ground pins. Fasten the tips of the four radial leads of the other counterpoise assembly to the snap hooks of the four guy stakes. Attach the lead-in wire from the center plate of Counterpoise CP–12 to the junction of Radio Frequency Cable Assemblies CG–784/U and CG–789/U. Use the clamp for good connection to the outer coaxial conductor.

15. Assembly of Mast

a. General. When the location for erecting the mast (pars. 10 and 11) has been chosen, drive the swivel stake through the base plate into the ground at the selected point; use the hammer supplied.

b. Mast Sections and Guy Plates (fig. 18).

(1) Place the mast sections in a line on the ground with the female end of each section pointing toward the swivel stake. If the mast is to be used as an antenna support, the direction in which the antenna will run should first be determined. The line of mast sections should be placed approximately 135° counterclockwise from the direction of the horizontal antenna to facilitate installation. The top guy plate should be positioned so that the odd hole will face toward the direction of the antenna when the mast is raised.

(2) Starting at the swivel stake, add the mast sections to the swivel stake one by one until five sections have been assembled. Allow the sections to rest on the ground.

Note. If the mast is to be used as a vertical antenna, add the base insulator to the swivel stake before adding the mast sections.

(3) Place a guy plate on the male end of the fifth section.

(4) Add five more mast sections to the first five sections and place a second guy plate on the male end of the tenth section.

(5) Add the last six sections to the first ten and place the third guy plate on the last section.

(6) If the vertical antenna is being used, add the whip adapter to the last mast section. Add the standard whip antenna, three Mast Sections MS–116–A, one Mast Section MS–117–A, and one Mast Section MS–118–A in that order.

c. Stakes (fig. 18). The four stakes should be located 25 feet from the swivel stake and approximately 90° apart. Proceed as follows:

(1) Locate and drive the first stake as close as possible to the line formed by the mast sections lying on the ground. Since each mast section is 2½ feet long when assembled, the stake should be located at the junction of the tenth and eleventh mast sections. When driving a stake, tilt the stake away from the mast base approximately 30°.

(2) Using a guy rope, measure the distance between the guy stake and the swivel stake (Mast Base AB–154/GRA–4). Mark the distance on the guy and, using this measurement, locate and drive the other three stakes approximately 90° apart.

d. Guys (fig. 19). The guys are color coded for ready identification: top, red; center, black; lower, blue. Each guy plate has four holes 90° apart, for attaching the guys. A fifth hole is provided for connection of a halyard and should be kept in the direction of the antenna when the halyard is to be used. Connect the guys as follows:

(1) The guys for the stake adjacent to the mast sections should be connected first. Attach the snap hook of each guy to the corresponding hole of the proper guy plate.

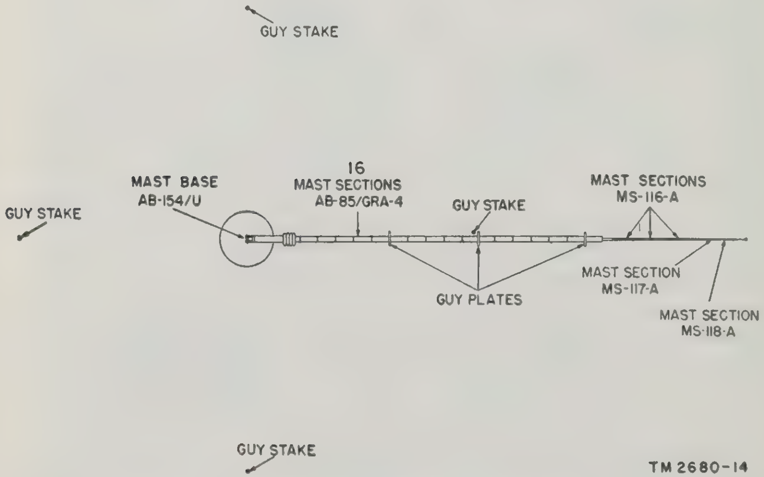


Figure 18. Assembling mast sections and positioning stakes.

(2) Stretch the guys out to the side stake to measure for the correct adjustment. Adjust each guy by means of Fastener FT–9.

(3) Carry the free end of each guy back to the adjacent stake and fasten it; be careful not to tangle the ropes.

(4) Attach the side guys to the side holes of the guy plates and to the side stakes; make the proper adjustment with the fittings. Do not tighten the guys enough to bend the mast; merely remove the slack.

(5) Connect the three front guys to the top holes of the guy plates and stretch the guys along the mast toward the fourth stake. If a halyard is used, fasten the pulley to the fifth hole of the top guy plate and tie the two ends of the halyard together to prevent the halyard from running through the pulley.

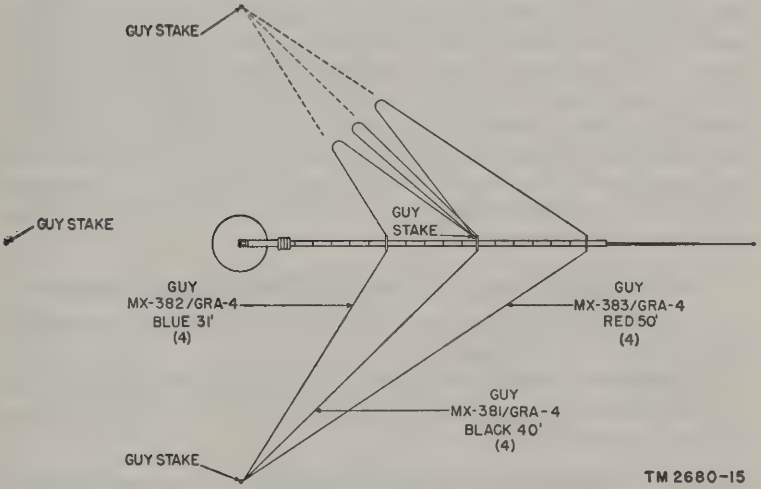

GUY STAKE
GUY STAKE
GUY STAKE
GUY STAKE
GUY MX-382/GRA-4 BLUE 31' (4)
GUY MX-383/GRA-4 RED 50' (4)
GUY MX-381/GRA-4 BLACK 40' (4)
TM 2680-15

Figure 19. Attaching the guys.

16. Raising of Mast

(fig. 20)

a. Two men are required to raise the mast. One man stands near the swivel stake, holding the halyard, if used, and the three guys. The second man takes his position at the far end of the mast.

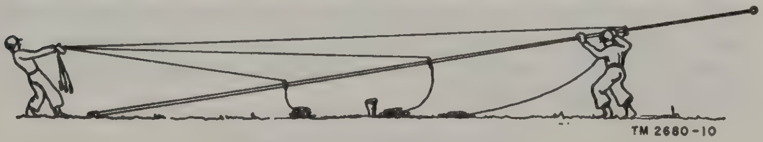


Figure 20. Raising the mast.

b. The first man pulls on one set of guys, being sure to keep more tension on the top guy so that the mast bows slightly. At the same time, the second man raises the end of the mast.

c. The first man walks toward the free stake, pulling on the guys. At the same time, the second man walks toward the swivel stake, raising the mast as he goes.

d. When the mast is upright and the slack set of guys has become taut, the second man assists the first in securing and adjusting the fourth set of guys to the free stake.

e. If further adjustment is necessary to bring the mast more nearly vertical, first slacken the guys which are too short, then tighten the guys that are too long, and finally tighten the guys that were slackened.

f. If the mast is to be used as a vertical antenna, the counterpoise is used. Place the counterpoise at the base of the mast and attach the eight radials to the terminals of Ground Rods GP–11 and to the snap hooks of the guy stakes. The lead-in wire of the counterpoise should be connected to a good ground. Attach the antenna lead-in wire from the radio set to the binding post on top of the base insulator. If Radio Frequency Cable Assemblies CG–784/U and CG–789/U are used to feed the antenna, fasten the lead-in wire from the counterpoise to the clamp on Radio Frequency Cable Assembly CG–784/U. The mast now appears as shown in figure 7. See paragraph 14*e* before setting up the vertical antenna.

17. Service Upon Receipt of Used or Reconditioned Equipment

a. Follow the instructions in paragraph 12 for uncrating, unpacking, and checking the equipment.

b. Check to see that the equipment is in proper operating condition.

c. Perform the appropriate installation procedures given in paragraphs 13 through 16.

Section II. OPERATION UNDER UNUSUAL CONDITIONS

18. Operation in Arctic Climates

No adjustment is necessary on Antenna Assembly AS–341/GR for operation under conditions of extreme cold If the antenna becomes covered with snow or ice, shut down the associated equipment and clear the insulators and all sections of the mast (if used as a vertical radiator) or the antenna wire (if horizontal antenna is used). Gently brush away the snow, or melt the ice accumulated on the component parts. Clear the area around the base of the antenna. Before resuming operation, examine the radiating elements to see that they have not been bent or broken.

19. Operation in Tropical Climates

Operation in humid areas may cause excessive corrosion of the component parts. Check frequently and apply corrective measures.

20. Operation in Desert Climates

The main problem that arises with equipment in desert areas is the large amount of sand, dust, or dirt which enters the equipment. Reels and cable connections should be kept clear of accumulations of sand and grit.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. ORGANIZATIONAL TOOLS AND EQUIPMENT

21. Tools Supplied

Hammer HM–1 and a 100-foot, stainless steel tape measure are supplied with this equipment.

22. Test Equipment

No test equipment is supplied with Antenna Assembly AS–341/GR. However, it may be necessary to make continuity checks or an insulation test during troubleshooting. Use an ohmmeter for making continuity checks, and use a megohmmeter for insulation tests. Multimeter TS–352/U can be used for these checks.

Section II. PREVENTIVE MAINTENANCE SERVICES

23. Definition of Preventive Maintenance

Preventive maintenance is work performed on equipment (usually when the equipment is not in operation) to keep it in good working order so that breakdowns and needless interruptions will be kept to a minimum. Preventive maintenance differs from trouble shooting and repair in that its object is to prevent certain troubles from occurring. See AR 750–5.

24. General Preventive Maintenance Techniques

a. Use #000 sandpaper to remove corrosion.

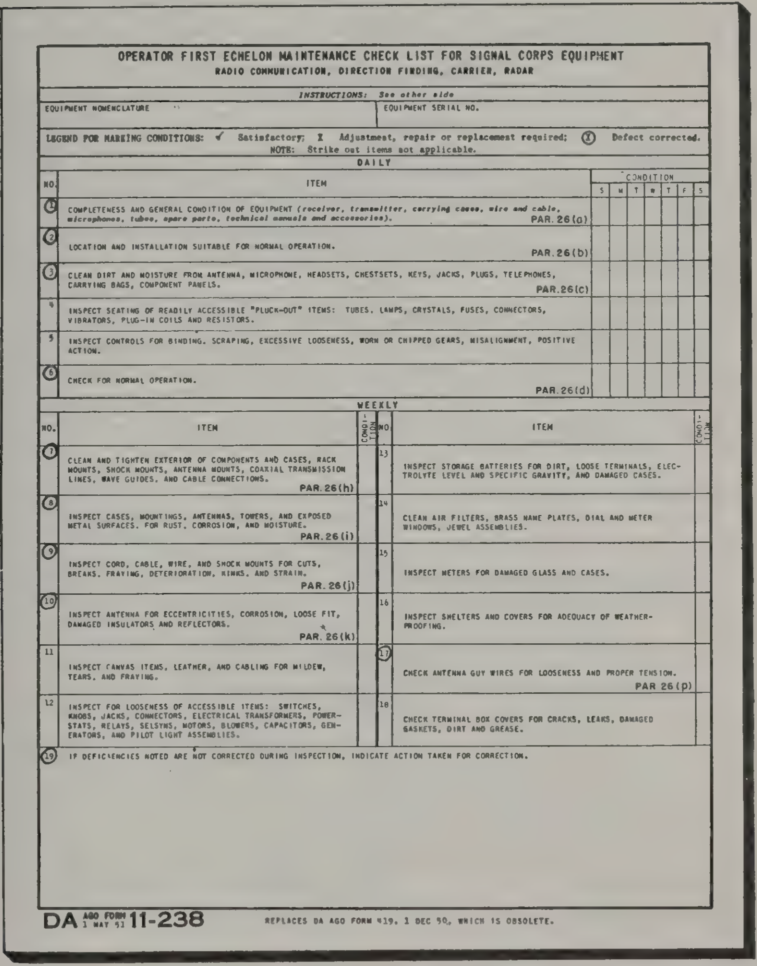
b. Use cheesecloth moistened with Solvent, Dry Cleaning (SD) for cleaning the radiating components.

25. Use of Preventive Maintenance Forms

(figs. 21 and 22)

a. The decision as to which items on DA AGO Forms 11–238 and 11–239 are applicable to this equipment is a tactical decision to be made in the case of first echelon maintenance by the communication officer/chief or his designated representative; and in the case of second and third echelon maintenance, by the individual making the inspection. Instructions for the use of each form appear on the reverse side of the form.

b. Circled items in figures 21 and 22 are partially or totally applicable to Antenna Assembly AS–341/GR. References in the ITEM block refer to paragraphs in text which contain additional maintenance information.



OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT
RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE
EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; Ⓧ Defect corrected.
NOTE: Strike out items not applicable.

DAILY

NO.	ITEM	CONDITION						
		S	M	T	W	T	F	S
①	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT *(receiver, transmitter, carrying cases, wire and cable, microphones, tubes, spare parts, technical manuals and accessories).* PAR. 26(a)							
②	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR. 26(b)							
③	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONE, HEADSETS, CHESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS, COMPONENT PANELS. PAR. 26(c)							
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS.							
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, WORN OR CHIPPED GEARS, MISALIGNMENT, POSITIVE ACTION.							
⑥	CHECK FOR NORMAL OPERATION. PAR. 26(d)							

WEEKLY

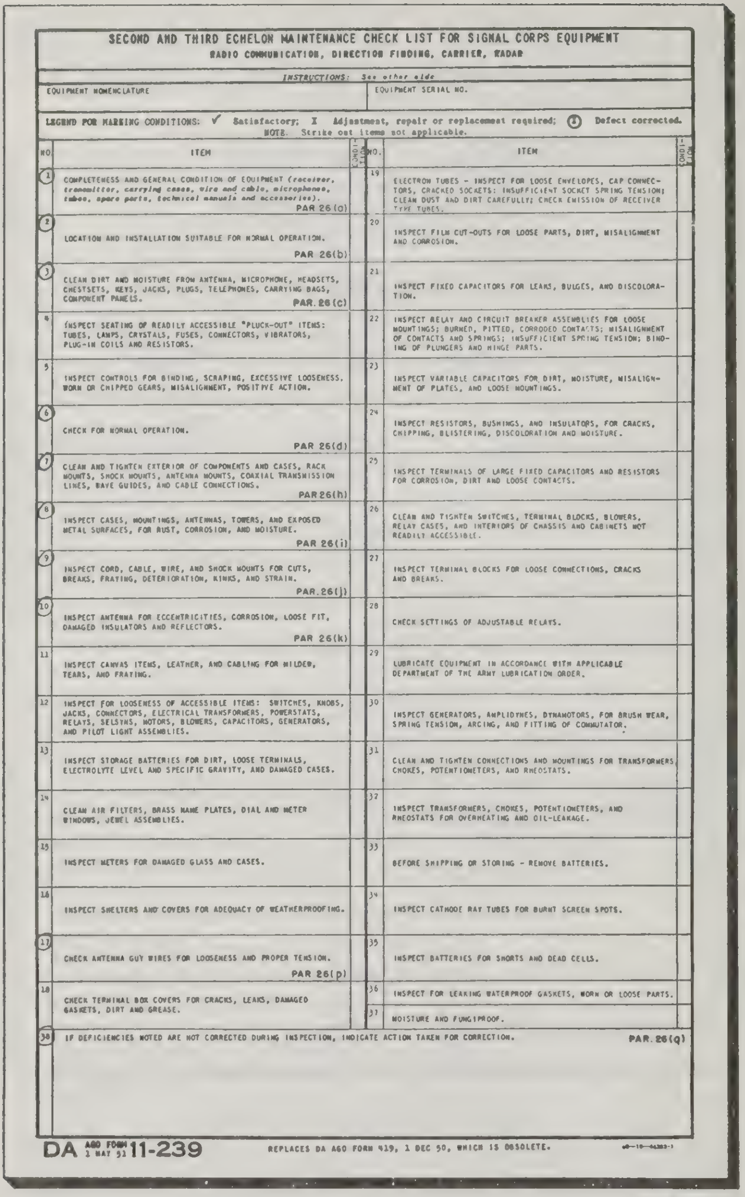
NO.	ITEM	CONDI-TION	NO	ITEM	CONDI-TION
⑦	CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS. PAR. 26(h)		13	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES.	
⑧	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 26(i)		14	CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.	
⑨	INSPECT CORD, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 26(j)		15	INSPECT METERS FOR DAMAGED GLASS AND CASES.	
⑩	INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS. PAR. 26(k)		16	INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHERPROOFING.	
11	INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.		⑰	CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION. PAR 26(p)	
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWERSTATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES.		18	CHECK TERMINAL BOX COVERS FOR CRACKS, LEAKS, DAMAGED GASKETS, DIRT AND GREASE.	

⑲ IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

DA AGO FORM 1 MAY 51 11-238 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM 2680-12

Figure 21. DA AGO Form 11–238.



SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT

RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE	EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; ⊗ Defect corrected.
NOTE. Strike out items not applicable.

NO.	ITEM	CONDI-TION	NO.	ITEM	CONDI-TION
①	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT *(receiver, transmitter, carrying cases, wire and cable, microphones, tubes, spare parts, technical manuals and accessories).* PAR 26(a)		19	ELECTRON TUBES - INSPECT FOR LOOSE ENVELOPES, CAP CONNECTORS, CRACKED SOCKETS: INSUFFICIENT SOCKET SPRING TENSION; CLEAN DUST AND DIRT CAREFULLY; CHECK EMISSION OF RECEIVER TYPE TUBES.	
②	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR 26(b)		20	INSPECT FILM CUT-OUTS FOR LOOSE PARTS, DIRT, MISALIGNMENT AND CORROSION.	
③	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONE, HEADSETS, CHESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS, COMPONENT PANELS. PAR. 26(c)		21	INSPECT FIXED CAPACITORS FOR LEAKS, BULGES, AND DISCOLORATION.	
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS.		22	INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR LOOSE MOUNTINGS; BURNED, PITTED, CORRODED CONTACTS; MISALIGNMENT OF CONTACTS AND SPRINGS; INSUFFICIENT SPRING TENSION; BINDING OF PLUNGERS AND HINGE PARTS.	
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, WORN OR CHIPPED GEARS, MISALIGNMENT, POSITIVE ACTION.		23	INSPECT VARIABLE CAPACITORS FOR DIRT, MOISTURE, MISALIGNMENT OF PLATES, AND LOOSE MOUNTINGS.	
⑥	CHECK FOR NORMAL OPERATION. PAR 26(d)		24	INSPECT RESISTORS, BUSHINGS, AND INSULATORS, FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE.	
⑦	CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS. PAR 26(h)		25	INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR CORROSION, DIRT AND LOOSE CONTACTS.	
⑧	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR 26(i)		26	CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES, AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE.	
⑨	INSPECT CORD, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 26(j)		27	INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.	
⑩	INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS. PAR 26(k)		28	CHECK SETTINGS OF ADJUSTABLE RELAYS.	
11	INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.		29	LUBRICATE EQUIPMENT IN ACCORDANCE WITH APPLICABLE DEPARTMENT OF THE ARMY LUBRICATION ORDER.	
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWERSTATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES.		30	INSPECT GENERATORS, AMPLIDYNES, DYNAMOTORS, FOR BRUSH WEAR, SPRING TENSION, ARCING, AND FITTING OF COMMUTATOR.	
13	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES.		31	CLEAN AND TIGHTEN CONNECTIONS AND MOUNTINGS FOR TRANSFORMERS, CHOKES, POTENTIOMETERS, AND RHEOSTATS.	
14	CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.		32	INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS, AND RHEOSTATS FOR OVERHEATING AND OIL-LEAKAGE.	
15	INSPECT METERS FOR DAMAGED GLASS AND CASES.		33	BEFORE SHIPPING OR STORING - REMOVE BATTERIES.	
16	INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHERPROOFING.		34	INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.	
⑰	CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION. PAR 26(p)		35	INSPECT BATTERIES FOR SHORTS AND DEAD CELLS.	
18	CHECK TERMINAL BOX COVERS FOR CRACKS, LEAKS, DAMAGED GASKETS, DIRT AND GREASE.		36	INSPECT FOR LEAKING WATERPROOF GASKETS, WORN OR LOOSE PARTS.	
			37	MOISTURE AND FUNGIPROOF.	
㊳	IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION. PAR. 26(q)				

DA AGO FORM 1 MAY 51 11-239 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM 2680-13

Figure 22. DA AGO Form 11-239.

26. Performing Preventive Maintenance

Warning: Shut down any associated transmitting equipment before attempting any maintenance. Severe r-f burns may result from handling the equipment while energy is being radiated.

Caution: Tighten screws, bolts, and nuts carefully. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

a. Check for completeness and a satisfactory condition of the antenna system. Visually inspect the masts and antenna wire from the ground for any obvious looseness, bends, or breakage.

b. Check to see that the location and installation are suitable for normal operation. Check to see that all stakes are secure, that the masts are erect, and no slack exists in guy wires.

c. Clean dirt and moisture from antenna base insulator and lead-in terminals.

d. Check for normal operation. If reception and transmission are not normal, check all connections to the antenna and the lead-in.

e. Check the coaxial cable for tightness and for cracked, cut, or frayed insulation.

f. Check the connections to the counterpoise at the eight stakes and at the counterpoise center plate.

g. Check to see that the halyard is taut and securely attached to the guy fastener at one of the stakes.

h. Clean and tighten exterior of components and cases, antenna mounts, transmission lines, and cable connections.

i. Inspect cases, masts, the antenna, and exposed metal surfaces, for rust, corrosion, and moisture.

j. Inspect the cable, the antenna wire, guys, and halyards for cuts, breaks, fraying, deterioration, kinks, and strain.

k. Inspect the antenna for eccentricities, corrosion, loose fit, damaged insulators, and connectors.

l. Clean the vase insulator and the insulator at the end of the halyard and inspect for fine line surface cracks where moisture and dust can accumulate and eventually form a leakage path.

m. Check the mast sections, especially at the joints, for dirt and corrosion. Clean if necessary.

n. Check and clean the counterpoise by wiping with a clean, dry cloth.

o. Clean the halyard insulators and the feedthrough insulator at the center of the antenna, and if used, inspect for fine line surface cracks where moisture and dust can accumulate and eventually form a leakage path.

p. Check antenna guy wires for looseness and adjust for proper tension.

q. If the deficiencies noted are not corrected during the inspection, indicate action taken for correction.

Section III. TROUBLESHOOTING

27. General

Open, leaky, or short circuits, in the antenna equipment, or bad connections are the only sources of equipment failure likely to occur in this equipment.

28. Inspection

Check all the electrical connections for tightness, and check the lead-in wires for a possible short or an open circuit. Check insulators for cracks, chips, or other defects.

Warning: Any associated transmitting equipment must be shut down before attempting any maintenance. Severe r-f burns may result from handling the equipment while energy is being radiated.

29. Locating Trouble

Shut down the power at the transmitter; disconnect the power end of the lead-in wire, and proceed as follows:

a. No Output. Lack of output usually is caused by a short or an open circuit.

(1) *Mast assembly.*

(*a*) If the mast assembly is used as a vertical antenna, check for continuity between the lead-in wire and the lowest mast section, using the low scale of the ohmmeter (par. 22). The reading should be close to zero. No reading, or a high reading, indicates that the lead-in wire (or a connection) is open or defective and must be repaired or replaced.

(*b*) Check continuity through each mast section. A high reading indicates poor contact, probably due to corrosion. If the mast sections need cleaning, refer to paragraph 30 for disassembly, and remove the corrosion with #000 sandpaper.

(2) *Antenna assembly.* Using the low scale of the ohmmeter (par. 22), check the continuity between the lead-in wire and the antenna components. Check the continuity from both conductors of the cable assembly. The reading should be close to zero. A higher reading indicates a defective cord. Replace the cord.

b. Weak Output. Check all components for natural obstructions which may form a path to the ground (foliage, fungus, etc.). Check all connections for tightness, and check all insulators for leakage.

Note. A weak output may be caused by incorrect installation Check the measurements made in determining the length of the antenna (par 13).

(1) *Mast assembly.* Make the checks outlined in *a*(1) above.

(2) *Antenna assembly.*

(*a*) Using the low scale of the ohmmeter (par. 22), check continuity between the set end of the coaxial cable and the antenna components. If Radio Frequency Cable Assembly CG–789/U is used, check continuity from both conductors to the antenna components. The reading should be close to zero. A higher reading indicates corrosion of the antenna elements or coaxial fittings. Clean the antenna wire (par. 24) and fittings.

(*b*) Using the multimeter (par. 22), check the insulation resistance between the inner and outer conductors of Radio Frequency Cable Assembly CG–789/U. The reading should be at least 10 megohms. If the reading is 0, the cable is probably defective. If the reading is less than 10 megohms but well above 0, lower the antenna, remove the cable from the insulator, and test the insulator, cable, and antenna components separately.

Section IV. REPAIR AND REPLACEMENT

30. Disassembly

Warning: Shut off all power before performing any repairs. To disassemble any of the various antennas, follow the instructions given below:

a. Slanting Wire Antenna.

(1) Disconnect the lead-in wire from the transmitter or receiver.

(2) Release the tied ends of the halyards and lower the antenna slowly, being careful not to damage the insulators.

(3) Unfasten the antenna wire or wires, the lead-in wire, and the reel from the insulator ends of the halyards.

(4) Wind the antenna wire onto each reel, using one hand to hold the reel against the body and to guide the wire, and the other hand to turn the handle.

Caution: Improper winding will result in kinks, which will render the wire useless.

(5) Remove the pulley support for the upper halyard.

(6) Remove the ground stake and wipe it clean.

(7) Coil the halyards and bind them.

b. L-Type Antenna. Follow the instructions in *a*(1) through (4) above and then proceed as follows:

(1) Tie the two ends of the mast halyard to prevent the free end from running through the pulley.

(2) Remove the pulley support for the other halyard.

(3) Coil the halyard and bind it.

c. Off-Center-Fed Hertz Antenna. Follow the instructions in *a*(1) through (4) above, and then proceed as follows:

(1) Remove the ground stake and clean it.

(2) Coil the halyards and bind them.

d. Center-Fed Hertz (Doublet) Antenna.

(1) Disconnect Radio Frequency Cable Assembly CG–789/U.

(2) Release the tied ends of the halyards and lower the antenna slowly, being careful not to damage the insulators.

(3) Unfasten the antenna wire terminations from the center insulator and unfasten the reels from the insulator ends of the halyards.

(4) Wind the antenna wire onto each reel.

(5) Unfasten the cable from the center insulator and coil the cable as follows:

(*a*) Make one coil and hold the coil in place with friction tape, or its equal.

(*b*) Using both hands, rotate the coil to wind up the remainder of the cable.

(6) Tie the two ends of each halyard to prevent the free end from running through the pulley.

e. Mast. To lower and disassemble the mast, follow the instructions given below:

(1) Disconnect and remove the counterpoise.

(2) If Insulator MX–384/GRA–4 is used, it must be removed before the mast is lowered. Slacken the guy ropes about 1½ feet; lift the mast while a second man removes the insulator. Replace the mast on the swivel stake.

(3) Remove all three guys from one stake located at a 90° angle to the pivot pin of the swivel stake.

(4) Holding all three guys firmly, walk slowly toward the mast. As the antenna tilts, the pull on the guys will become stronger.

(5) Brace yourself firmly while walking. Continue until mast reaches the ground.

(6) To disassemble, reverse assembly instructions given in paragraph 15.

(7) Remove stakes and swivel stake. Clean stakes and plate.

(8) Coil and bind the halyard, if used, and each guy.

31. Replacement of Parts

If any component becomes defective, it should be replaced by a new component from spare parts. The only item of the antenna assembly which can be replaced readily is the coaxial cable connector (fig. 23). Radio Frequency Cable RG–59A/U has three layers and a core: an outer jacket, copper braid, and polyethylene insulation comprise the three layers, and a copperweld conductor is the core. To install a connector on the end of a cable, proceed as follows:

a. Remove ¾ inch of the outer jacket.

b. Disassemble the connector (fig. 23).

c. Slide the threaded nut over the cable.

d. Slide the thin washer over the cable.

e. Slide the rubber gasket over the cable, allowing 1/16 inch of the outer jacket to protrude.

f. Slide the chamfered sleeve over the copper-braid shield.

g. Flare the braid around the sleeve.

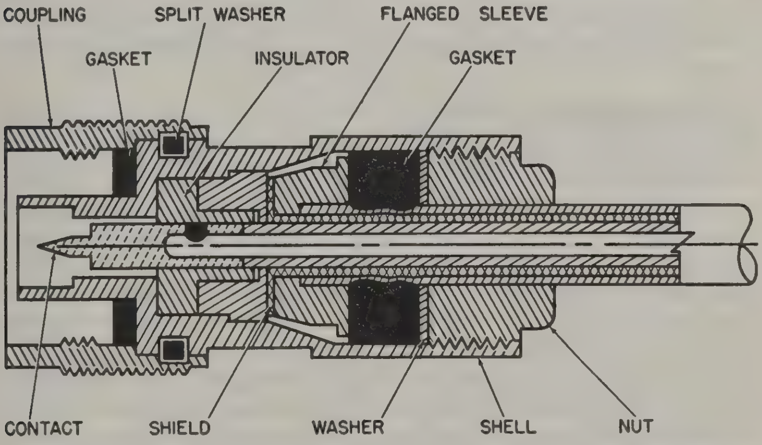
h. Remove excess braid so that it is even with the outer edge of the chamfer.

i. Bare the center conductor by removing 3/16 inch of insulation from the end of the cable.

j. Slide the contact over the conductor and solder through the solder hole; file it smooth.

k. Insert the cable into the assembly shell.

l. Tighten the nut securely. When the cable and connector are properly assembled, the socket tip should be flush with, or not more than 1/32 inch beneath the edge of the coupling.



TM 2651-24

Figure 23. Cutaway view of coaxial cable connector.

CHAPTER 4
THEORY

Section I. CIRCUIT THEORY

32. General

Five different types of antenna installation are available with Antenna Assembly AS–341/GR: vertical, center-fed Hertz, off-center-fed Hertz, L-type, and slanting wire. These five types of antenna installations used with this set are variations of the basic half-wave antenna and differ fundamentally only in the manner of installation and method of feeding the signal from the transmitter to the antenna or from the antenna to the receiver. The characteristics of transmitting and receiving antennas are similar, with the result that a good transmitting antenna also will function well for reception. Certain practical limitations on the use of the same antenna for both transmitting and receiving are pointed out in the paragraphs that follow.

33. Basic Half-Wave Antenna

During transmission, an r-f current in a conductor produces an electromagnetic field which is radiated. During receiving periods, an electromagnetic field which is cut by a conductor will cause a current flow in the conductor. If the length of the conductor wire is equal to half the wavelength of the electromagnetic wave, the result is a half-wave antenna. In a half-wave antenna, current is always maximum at the center and minimum at the ends, while voltage is minimum at the center and maximum at the ends (fig. 24). Impedance is minimum at the center and maximum at the ends. The impedance at the center of a half-wave antenna is approximately 72 ohms, and the impedance at the ends is 2,500 ohms. The current distribution in the antenna is always the same regardless of the amount of current flow, but the amplitude of the current at any point on the antenna varies directly with the amplitude of the signal voltage.

34. Computing Antenna Length

An antenna, when properly tuned, is a resonant circuit and acts in the same manner as any other resonant circuit, such as the tank circuit in a radio receiver or transmitter. The wire used to make up the antenna has a certain amount of inductance per foot and a certain amount of distributed capacitance per foot. When the wire is placed above the ground, there is a small amount of capacitance between the wire and the ground. When the inductive reactance of the wire is equal to the capacitive reactance of the wire, the antenna is resonant. Hence, a half-wave antenna, when cut to the correct length, presents a resistive load to the transmitter. The formula for determining the physical length of an antenna is—

$\frac{300{,}000{,}000}{\text{freq in cycles}} = 1$ wavelength in meters; for a half-wave antenna, the formula becomes—

$$\frac{492}{\text{freq in mc}} = \text{length in feet.}$$

This formula gives the length at the natural resonant frequency of a solid conductor in free space and assumes zero resistance in the conductor. The physical length of an antenna is affected also by its height above ground and by the size and type of wire used for its construction.

These effects, together with the capacitance of supporting insulators at the ends of the antenna, tend to shorten the antenna by about 5 percent of 1 half-wavelength. The formula shown above then becomes—

$$\frac{492 \times .95}{\text{freq in mc}} \text{ or } \frac{468}{\text{freq in mc}} = \text{length in feet.}$$

Half-wavelength values for frequencies from 1.5 mc to 20 mc are shown in table II. The lengths in the chart are correct when using Wire W–120 with a reel on either or both ends.

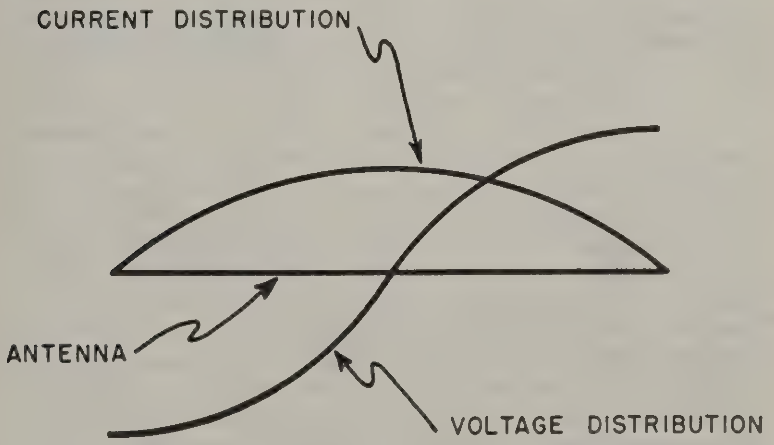


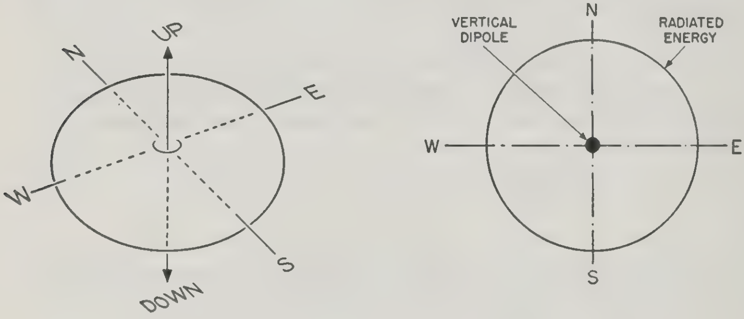
Figure 24. Current and voltage distributions on half-wave antenna.

35. Directive Patterns

(fig. 25)

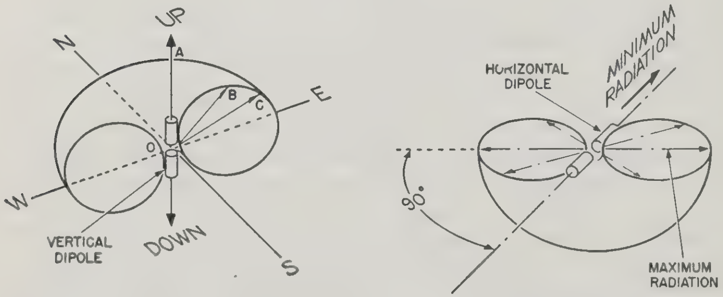
a. General. Maximum radiation occurs at the center of a half-wave antenna, since the current is greatest at that point. Conversely, since the current is minimum at the ends, little radiation takes place there. The radiation is at right angles to the plane of the antenna wire and encircles the conductor completely. The resulting antenna pattern, therefore, can be compared to a doughnut with the radiator passing through its center (A, fig. 25).

b. Vertical Antenna Pattern. The vertical antenna radiates equally in all directions in the horizontal plane. The field pattern in the horizontal plane which results from a vertical antenna is shown in B, figure 25. The field pattern is a circle, and the field strength is the same in any horizontal direction from the antenna wire. Although there is no vertical radiation along the direct line of the axis of the



A. SURFACE PATTERN SHOWING DOUGHNUT SHAPE

B. HORIZONTAL CROSS SECTION SHOWING HORIZONTAL DIRECTIVITY OF VERTICAL DIPOLE



C. CROSS SECTION WHEN ANTENNA IS VERTICAL

D. CROSS SECTION WHEN ANTENNA IS HORIZONTAL

TM 2651-25

Figure 25. Radiation patterns of half-wave antenna.

vertical antenna, there are different amounts of radiation at different angles to the line of the antenna axis. A cross-section of the doughnut-shaped pattern is shown in C, figure 25. It is readily seen that along line OA there is little radiation, while there is some radiation along line OB, and even more along line OC.

c. Horizontal Half-Wave Antenna Pattern. Half of a doughnut-shaped pattern for the horizontal half-wave antenna is shown in D, figure 25. As in the vertical antenna, maximum radiation occurs in a plane perpendicular to the center line of the antenna, and as the plane angle decreases from the perpendicular, the radiation also decreases. Thus, there is considerable radiation in planes other than the horizontal. This radiation travels upward and, at the frequencies of the equipment, strikes the ionosphere and bounces back, resulting in propagation of the wave over considerable distances. This type of wave propagation is called *sky wave.* The relative length of the vectors illustrates the variation of the amount of radiation with the change in plane angle. The directive pattern of the horizontal half-wave antenna is bidirectional in the horizontal plane and the antenna should be oriented in the direction of maximum signal strength.

Section II. ANTENNA CIRCUITS

36. Vertical Antennas

a. Application. The vertical grounded antenna uses the antenna mast and whip section as the radiator. This antenna is suitable for both transmitting and receiving over short ranges (0 to 30 miles) at low frequencies of 1.7 mc to 2.0 mc. The radiation pattern of the vertical antenna is nondirectional in a horizontal plane, and the signal travels close to the earth. Hence, this antenna is most efficient in fairly open terrain, since the radiation pattern might be distorted by large masses (buildings, etc.), and heavy foliage and undergrowth tend to absorb the signal. Signals may be heard better at night because of increased reflection from the ionosphere.

b. Operation. The vertical antenna is a variation of the basic half-wave antenna. In this antenna, the mast and whip represent a ¼ wavelength of the radio signal, and the other ¼ wavelength is supplied by a ground image to make up the required half-wave antenna. The single-wire feed line is connected to the binding post at the base of the mast (which is insulated from ground by Insulator MX–384/GRA–4). Good ground image effect is secured by the use of Counterpoises CP–12 and CP–13. In the case of the antenna, the missing half of the antenna is supplied by what can be regarded as the *image* of the radiating portion in the ground. The distribution of current, voltage, and impedance in the radiator is the same as that of one-half of the simple half-wave antenna described above. The grounded vertical antenna is advantageous at low frequencies, since it reduces by half the total physical length of the antenna. At the low frequencies used with this type of antenna, the physical length required for a full half-wave antenna becomes impractical. The physical length of the vertical grounded antenna may be more than ¼ wavelength, but it must be an odd number of ¼ wavelengths if resonance is to be obtained at the base where the feed line is connected. If the antenna is over a quarter wavelength high, but less than a half wavelength, the input at the base will be inductive, requiring the addition of capacitance in series with the feed to make the input resonant.

c. Use of Counterpoise. The counterpoise is an artificial ground which is quite effective. Its use is particularly beneficial when an extensive buried system is not practicable, or when the ground resistance of an ordinary pipe or rod ground cannot be made to have sufficiently low resistance, as in rocky or sandy soils. As a rûle, the best performance will be secured when a counterpoise is insulated from ground. To work properly, a counterpoise should have considerable capacity to ground, which means that it should cover as much ground area as the location will permit. The counterpoise may be of any convenient shape. A good form is an approximately circular arrangement using radial wires with cross-connectors joining them at intervals. Counterpoises CP–12 and CP–13 are used with Antenna Assembly AS–341/GR as an artificial ground with earth connections. The ends of each of the eight radial leads is fastened to the binding post of a Ground Rod GP–11. The counterpoise will give improved antenna performance whether mounted off the ground, lying upon the ground, or used with actual earth connections.

37. Horizontal Antennas

In the jungle and other locations where vegetation is dense, the vertical antenna cannot be used, because all the ground wave is absorbed. This necessitates the use of a horizontal antenna and sky-wave communications.

a. Center-Fed Hertz Antenna. The center-fed Hertz (doublet) antenna is always ½ wavelength long and is fed at the center by coaxial cable. This antenna can be used on all frequencies from 1.5 mc to 20 mc. It consists of two lengths of wire, each ¼ wavelength long at the operating frequency. The center-fed Hertz antenna is similar to the vertical antenna described above, except that the image supplied by the ground in the vertical antenna is replaced here by an actual physical ¼ wavelength of wire. The transmission line is a 72-ohm impedance coaxial cable which is connected to the low-impedance point at the center of the antenna. Current and voltage distribution are the same as those described for the simple half-wave antenna; current is maximum at the center and zero at the ends, and voltage is maximum at the ends and minimum at the center. Since this antenna is independent of ground, it can be installed far above the surface of the earth. The center-fed Hertz antenna is an efficient radiator and is commonly used.

b. Off-Center-Fed Hertz Antenna. The off-center-fed Hertz antenna consists of a ½ wavelength of wire fed by means of a single-wire feeder. This antenna may be used on all frequencies in the range of 1.5 mc to 20 mc. The distribution of current, voltage, and impedance is the same in this antenna as in the center-fed Hertz antenna. The impedance of a single-wire feeder is approximately 500 ohms, and the feeder therefore is connected at a 500-ohm point on the antenna. The point at which the feeder is connected to the antenna can be found by multiplying the antenna length by .361; the resulting figure is the number of feet from one end of the antenna to the feeder. The directive pattern of the off-center-fed Hertz antenna is the same as that of the center-fed Hertz antenna.

c. L-Type Antenna. The L-type antenna is physically similar to the off-center-fed Hertz antenna. This antenna consists of a ½ wavelength of wire fed by means of a single-wire feeder. The distribution of current, voltage, and impedance is the same as in the half-wave antenna previously described. The feeder is connected at one end; a high-voltage, maximum-impedance point. For most efficient matching, therefore, the feeder should be ¼ wavelength, and should be exactly perpendicular. A feeder of ¼ wave length shows a continuity of the standing-wave current with that of the antenna and causes a minimum of radiation loss. Any other length of feeder causes a mismatch and tends to set up a radiation field about the feeder which interferes with the desired radiation of the antenna.

d. Slanting Wire Antenna. The slanting wire antenna is an adaptation of the horizontal antenna. This antenna is usually ½ wavelength long, and is fed at the lower end. Radiation takes place at right angles to the antenna wire.

CHAPTER 5

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

38. Disassembly

Follow the disassembly instructions given in paragraph 30.

39. Repacking for Limited Storage

a. The exact procedure in repacking for shipment or limited storage depends on the material available and the conditions under which the equipment is to be shipped or stored. Refer to paragraph 12 and follow the instructions in reverse order.

b. Pack the components in corrugated cartons. Protect the components with a waterproof paper barrier. Seal the seams of the paper barrier with a waterproof sealing compound or tape. Pack the protected components in a wooden case.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

40. General

The demolition procedures outlined in paragraph 41 are to be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the commander.

41. Methods of Destruction

a. Smash. Smash coaxial fittings and insulators.

b. Cut. Cut wires, halyards, guys, bag, counterpoise, etc.

c. Burn. Burn cords, halyards, guys, and technical manuals, using gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend mast sections, stakes, whips, whip adapter, carrying device, reels, and measuring tape.

e. Explode. If explosives are necessary, use firearms, grendades, or TNT.

f. Disposal. Bury or scatter the destroyed parts in slit trenches, fox holes or other holes, or throw them into streams.

g. Destruction. Destroy everything.

APPENDIX I

REFERENCES

Note. For availability of items listed, check SR 310–20–3, SR 310–20–4, and SR 310–20–5. Check Department of the Army Supply Manual SIG 1 for Signal Corps Supply Manuals.

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1. Army Regulations

AR 380–5	Military Security—Safeguarding Security Information.
AR 750–5	Maintenance of Supplies and Equipment—Maintenance Responsibilities and Shop Operation.

2. Auxiliary Equipment and Test Equipment

TM 11–2613	Voltohmmeter I–166.
TM 11–2624B	Voltohmmeters TS–294/U, TS–294B/U, and TS–294C/U.
TM 11–2626	Test Units I–176, I–176–A, and I–176–B.
TM 11–5527	Multimeter TS–352/U.

3. Painting, Preserving, and Lubrication

TB SIG 13	Moistureproofing and Fungiproofing Signal Corps Equipment.
TM 9–2851	Painting Instructions for Field Use.

4. Camouflage, Decontamination, and Demolition

FM–5–20	Camouflage, Basic Principles.
FM 5–25	Explosives and Demolitions.
TM 3–220	Decontamination.

5. Other Publications

FM 24–18	Field Radio Techniques.
SR 310–20–3	Index of Training Publications.
SR 310–20–4	Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
SR 310–20–5	Index of Administrative Publications.
SR 700–45–5	Unsatisfactory Equipment Report (Reports Control Symbol CSGLD–247(R1)).
SR 725–405–5	Preparation and Submission of Requisitions for Signal Corps Supplies.

5. Other Publications—Continued

SR 745–45–5 Navy Shipping Guide, Article 1850–4 AFR 71–4	Report of Damaged or Improper Shipment (Reports Control Symbols CSGLD–66 (Army), S and A–70–6 (Navy), and AF–MC–U2 (Air Force)).
TB SIG 4	Methods for Improving the Effectiveness of Jungle Radio Communication.
TB SIG 66	Winter Maintenance of Signal Equipment.
TB SIG 72	Tropical Maintenance of Ground Signal Equipment.
TB SIG 75	Desert Maintenance of Ground Signal Equipment.
TB SIG 178	Preventive Maintenance Guide for Radio Communication Equipment.
TB SIG 219	Operation of Signal Equipment at Low Temperatures.
TB SIG 223	Field Expedients for Wire and Radio.
TM 11–455	Radio Fundamentals.
TM 11–466	Radar Electronic Fundamentals.
TM 11–476	Radio Direction Finding.
TM 11–483	Suppression of Radio Noises.
TM 11–486	Electrical Communication System Engineering.
TM 11–499	Radio Propagation.
TM 11–661/ TO 16–1–218	Electrical Fundamentals (Direct Current).
TM 11–666	Antennas and Radio Propagation.
TM 11–681	Electrical Fundamentals (Alternating Current).
TM 11–4000	Trouble Shooting and Repair of Radio Equipment.

APPENDIX II

IDENTIFICATION OF REPLACEABLE PARTS

1. Requisitioning of Parts

The fact that a part is listed in this table is not sufficient basis for requisitioning the item. Requisitions must cite an authorized basis, such as a specific T/O&E, T/A, SIG 7 & 8, list of allowances of expendable material, or another authorized supply basis. The Department of the Army Supply Manual applicable to the equipment covered in this manual is SIG 7 & 8 AS–341/GR.

2. Antenna Assembly AS–341/GR

Name of part and description	Function of part	Signal Corps stock No.
ANTENNA ASSEMBLY AS–341/GR: single wire type; ground plane type w/8 ground elements; multiple wire type; 1.5–20 mc freq range; 50 ohms approx characteristic input impedance; coaxial transmission MS line feeder.	Used to receive electromagnetic waves	2A290A–4
ADAPTER: Radio Frequency Cable Adapter UG–1024/U; flat, rect; 3⅝″ lg x 2 9/16″ wd x 1″thk.	Adapts r-f cable to antenna wire	3G360–13
ANTENNA ADAPTER MX–857/GRA–4: aluminum; one coat olive drab enamel w/one coat metal primer; 10⅞″ lg, 1.625″dia.	Adapts Mast Section AB–85/GRA–4 to Mast Section MS–116–A or MS–117–A.	2A180–10
BAG BG–102–A: canvas, olive drab; 14″ lg x 14″ wd x 9″ thk o/a; closed by two straps; canvas shoulder strap; waterproof.	To carry and store antenna equipment	2Z502
CASE: antenna; aluminum, natural finish; 41″ lg x 2¼″ dia; hollow tube.	Storage of whip antenna sections	6F504–13
COUNTERPOISE CP–12: radial type; 4 cond, #30 AWG, 102′; copper wire, stranded.	Establishment of constant ground screen	2A712
COUNTERPOISE CP–13: radial type; 4 cond; 25′ lg; #30 AWG, copper stranded.	Used with Counterpoise CP–12 as ground screen	2A713
FRAME MX–1116/GRA–4: used to store antenna equipment; aluminum; one coat olive drab enamel w/one coat metal primer; 2 frames held together by a turnbuckle cable assy; 40″ lg x 10½″ wd x 8⅜″ d.	Storage of antenna mast sections and equipment	2Z4600–20
GROUND ROD GP–11: single eye with term. bolt; steel, galv; 9″ x ¼″ hex.; 6–32 x ¼″ term. screw.	To anchor counterpoise to ground	4A811
GUY MX–381/GRA–4: nylon rope; olive drab finish; 40′ lg, 3/16″ dia, 800 lb min breaking strength; c/o 40′ nylon rope, 7 clamps, 1 ins, 1 snap, 1 fastener, 1 thimble.	Antenna support	2A1348–381

GUY MX–382/GRA–4: nylon rope; olive drab finish; 31′ lg, 3/16″ dia, 800 lb min breaking strength; 31′ nylon rope, 7 clamps, 1 ins, 1 snap, 1 fastener, 1 thimble.	Antenna support	2A1348–382
GUY MX–383/GRA–4: nylon rope; olive drab finish; 50′ lg, 3/16″ dia, 800 lb min breaking strength; c/o 50′ nylon rope, 7 clamps, 1 snap, 1 thimble, 1 fastener.	Antenna support	2A1348–383
GUY PLATE MX–1470/U: steel; disk shape; 3″ dia, .093″ thk, one 1.375″ dia mtg hole.	To attach guy wires to mast sections	2Z7090.250
GUY STAKE GP–111/G: loop end w/ring and snap; steel; one coat olive drab enamel w/one coat metal primer; 18½″ lg, 1¼″ x 1¼″ angle, 3/16″ thk.	For anchoring guy to ground	2A3328–111
HALYARD MX–516/GRA–4: nylon rope; olive drab finish; 140′ lg, 3/16″ dia, 800 lb min breaking strength; 140′ nylon rope, 7 clamps, 1 block, 1 S-hook, 1 snap, 1 ins, 1 fastener assy.	For hoisting and supporting antenna wire	2A3180.1–516
HAMMER, HM–1: double face head; 36 oz head, #0; steel; 15″ lg hickory handle, steel head.	Used to drive guy stakes	6Q49001
INSULATOR MX–384/GRA–4: standoff; cylindrical corrugated shape, MBCA ref dwg group 9; ⅝″ x 3″.	Used to prevent current flow through mast sections to ground stake.	3G650–384
MAST BASE AB–154/U: aluminum; one coat olive drab w/one coat primer; socket joint; 11¼″ lg rod driven into ground.	Supporting base for antenna	2A3330–17
MAST SECTION AB–85/GRA–4: one piece construction; aluminum tubing; olive drab enamel w/one coat metal primer; 1.355″ dia at base, 1.620″ dia at top, 36″ lg sect.	Section of antenna	2A2450–85
MAST SECTION MS–116–A: one piece; steel; copper plated w/one coat metal primer and one coat olive drab enamel; .3360″ dia at base, .393″ dia at top, 39½″ lg.	Section of whip antenna	2A2416
MAST SECTION MS–117–A: one piece; steel; copper plated w/one coat metal primer and one coat olive drab enamel; .3360″ dia at base, .252″ dia at top, 39½″ lg.	Used as section of whip antenna	2A2417
MAST SECTION MS–118–A: one piece; steel; copper pl w/one coat metal primer and one coat olive drab enamel; .215″ dia at base, ⅛″ dia at top, 39½″ lg.	Top mast section of antenna	2A2418

2. Antenna Assembly AS–341/GR—Continued

Name of part and description	Function of part	Signal Corps stock No.
RADIO FREQUENCY CABLE ASSEMBLY CG–784/U: Radio Frequency Cable RG–59/U; coaxial; 72 ohms characteristic impedance; 2300 v rms max operating voltage; single cond, solid, #22 AWG steel wire, copper covered; shield, single braid, copper wire, bare; assy 28'' lg o/a; terminates in Plug UG–260/U located on one end; solderless connector located on other end.	Connects vertical antenna with Radio Frequency Cable Assembly CG–789/U.	3E5999A–3.16
RADIO FREQUENCY CABLE ASSEMBLY CG–789/U: Radio Frequency Cable RG–59A/U; coaxial; 72 ohms characteristic impedance; 2300 v rms max operating voltage; single cond solid, #22 AWG steel wire, copper covered; assy 50' 4'' lg o/a; terminates in Jack UG–262/U; Plug UG–260/U, located on other end.	Connects antenna to radio set	3E5999A–3.17
REEL ASSEMBLY RL–122/GRA–4: hand operated; 150'' antenna wire capacity; aluminum frame; disk shaped frame 4⅜'' dia x 1⁷⁄₁₆'' d; bracket 12½'' lg x 1'' wd x 1⁷⁄₃₂'' d.	For winding, storing, and dispensing antenna wire.	2A3098–7
TAPE, measuring: steel; 100' lg extended; 4½'' dia x ¾'' thk o/a; 1/100' graduations; ⅜'' wd and .007'' thk; brown leather jacket.	To measure and lay out antenna guys, stakes, etc.	6R36026.3

3. Antenna Adapter MX–857/GRA–4

Name of part and description	Function of part	Signal Corps stock No.
CAP, antenna support: aluminum; 6⅞'' lg x 1.615'' dia; cylindrically shaped.	To house wiper contacts and mount antenna adapter.	2Z1607–75
FERRULE: zinc plated; brass sleeve having at least two full threads; 3⅞'' lg x .386'' dia o/a.	Part of Antenna Adapter MX–857/GRA–4------	
PIN, roller: steel; split hollow; 1.625'' lg x .125'' dia o/a-----------	Holds tube sections of the antenna adapter together.	
PIN, taper: steel, zinc plated; .341'' largest dia; ⅝'' lg o/a---------	To secure ferrule to antenna support-----------	
SUPPORT, antenna: 8¼'' lg, cylindrically shaped, 1⅝'' dia; aluminum.	Part of Antenna Adapter MX–857/GRA–4-----	

4. Case, Antenna

Name of part and description	Function of part	Signal Corps stock No.
CASE: antenna; aluminum; one coat olive drab enamel w/one coat primer; 41'' lg x 2.5'' dia o/a; hollow tubing.	To store Mast Sections MS–116–A, MS–117–A and MS–118–A.	
CAP: antenna case; cap, chain and rubber gasket; aluminum; permalube coating on thd; one coat olive drab enamel w/one coat primer; ½'' lg x 2$\frac{11}{16}$'' dia.	Cap for antenna case-------------------------	2Z1612.5
CLIP: spring; steel, one coat olive drab enamel w/one coat primer; 2⅝'' dia x .1285'' thk.	To attach chain and cap to case---------------	2Z2712.323

5. Counterpoise CP–12

Name of part and description	Function of part	Signal Corps stock No.
CLAMP: brass; ⅝″ lg x .506″ wd x .375″ o/a	To clamp and secure ends of wire	
BOARD, terminal: brass; 2 solder term.; 4⅛″ lg x ¾″ wd x .86125″ thk.	Terminates counterpoise elements and lead-in wire.	3Z770–2.127
WIRE, electrical: ins; single cond; #18 AWG stranded; copper	Counterpoise elements	1B818.150
WIRE, electrical: ins; single cond; #14 AWG stranded; copper	Counterpoise lead-in wire	1B814.140

6. Counterpoise CP–13

Name of part and description	Function of part	Signal Corps stock No.
CLAMP: brass; ⅝″ lg x .506″ wd x .375″ thk o/a	To clamp and secure ends of wire	
BOARD, terminal: brass; 2 solder term.; 4⅛″ lg x ¾″ wd x 19/64″ thk; mtd to CP–12 by means of slotted hole in center.	Terminates counterpoise elements	3Z770–1.28
WIRE, electrical: ins; single cond; #18 AWG stranded; copper	Counterpoise elements	1B818.150

7 Frame MX-1116/GRA-4

Name of part and description	Function of part	Signal Corps stock No.
BUCKLE: bronze, natural finish; tongueless, double bar type; for ⅝″ wd strap; 1 11/32″ lg x 25/32″ wd x 5/32″ thk.	Strap fastener.	
CABLE, mechanical: steel ⅛″ OD; 7 strands; 1900 lb breaking strength; not assy, cable 34″ lg.	Part of cable assembly	1A704
CABLE ASSEMBLY, mechanical: steel ⅛″ OD; 7 strands; 1900 lb breaking strength; 37½″ lg o/a; 8″ lg turnbuckle one end; 31/32″ lg eyebolt at other end.	Used to connect the two housing plates	6Z7946.1
CLAMP: bronze; 1 bolt; 11/16″ lg x ⅝″ wd x ⅝″ thk; holds two ⅛″ dia cables.	To clamp cable ends in loop	2Z2636-95
GUIDE, shaft: aluminum; 1″ lg x ⅜″ dia o/a	Strap guide.	
HOLDER, strap: aluminum; holds strap by sliding through loop in webbing.	To attach carrying strap to frame	2Z5042-135
INSERT, threaded: stainless steel, one coat olive drab enamel w/one coat primer; internally threaded cylinder with shoulder; ¼″ lg x .745″ dia o/a.	To mount eyebolt.	
PLATE, housing: assy; aluminum; one coat olive drab enamel w/one coat primer; ¼″ thk rectangular plate with 11 graduated tubular holders for mast sect. and one bracket for holding 3 mast sect.; 10½″ lg x 8⅜″ wd x 2½″ d.	Used to house mast sections.	
PLATE, housing: assy; 1 handle, 1 retaining strap, 1 insert, 1 eyebolt, 1 end plate; aluminum; one coat olive drab enamel w/one coat metal primer; 10½″ lg x 8⅜″ wd x 1 5/16″ thk.	Used to house mast sections.	
PLATE, housing: aluminum; one coat olive drab enamel w/one coat primer; ¼″ thk rectangular plate with 11 tubular holders for mast sect. and one bkt for holding 3 mast sect. 10½″ lg x 8⅜″ wd x 1 5/16″ d.	Part of housing plate assembly	2A2822-32

7. Frame MX-1116/GRA-4—Continued

Name of part and description	Function of part	Signal Corps stock No.
PLATE, housing: aluminum; one coat olive drab enamel w/one coat metal primer; ¼″ thk rectangular plate with 11 graduated tubular holders for mast sect. and one bracket for holding 3 mast sect.; 10½″ lg x 8⅜″ wd x 2½″ d.	Part of housing plate assembly	2A2822-31
STRAP, carrying: olive drab cotton webbing; 8″ lg x 1″ wd x ¼″ thk	Used to carry frame	6Z8448-34
STRAP, retaining: olive drab cotton webbing; 29″ lg x ⅝″ wd x ⅛″ thk.	Used to secure three Mast Sections AB-85/GRA-4.	6Z8567-21
STRAP ASSEMBLY: c/o 1 strap, 1 buckle, 1 end clip, 2 grommets; olive drab cotton webbing; 29″ lg x ⅝″ wd x 7/16″ thk.	Used to secure three Mast Sections AB-85/GRA-4.	
THIMBLEYE: steel; galv; loop shaped; 1¾″ lg x ⅝″ wd for ⅛″ dia rope; has eye shaped hole.	Cable termination.	
TIP, strap: brass, ⅝″ lg x 23/32″ wd x 3/16″ thk	Used to shield end of cotton strap.	
TURNBUCKLE: open buckle type; forged steel; galv; 8 1/16″ lg o/a length closed.	Used to tighten or loosen cable assembly	6Z8782-2

8. Guys MX–381/GRA–4, MX–382/GRA–4, and MX–383/GRA–4

Name of part and description	Function of part	Signal Corps stock No.
CLAMP: brass; one coat olive drab enamel w/one coat primer; $\frac{5}{8}$″ lg x .5062″ wd x .375″ h o/a; designed to hold 2 lays of $\frac{3}{16}$″ dia rope.	To clamp rope lays on Guy MX–381/GRA–4	6Z1932–38
CLAMP: brass; one coat olive drab enamel w/one coat primer; $\frac{5}{8}$″ lg x $\frac{5}{16}$″ wd x .255″ d o/a; designed to hold $\frac{3}{16}$″ dia rope.	To protect end of guy	2Z2642.697
HOOK: malleable iron; zinc finish; one coat olive drab enamel w/one coat primer; hook shaped w/snap; $2\frac{7}{8}$″ lg x $1\frac{3}{16}$″ wd x $\frac{5}{8}$″ thk; mtd by a $\frac{3}{4}$″ ID hole 1 end; $\frac{1}{2}$″ loop other end.	To attach guy to guy plate	2A1400–1
INSULATOR, strain: ceramic; brown glaze finish; cylindrical; 3″ wd x $\frac{3}{4}$″ thk x 4″ lg; 450 lb tensile strength.	Used to insulate the guy line from the mast	3G3552–24.1
ROPE: nylon; twisted; $\frac{3}{16}$″ dia; olive drab finish; mildewproofed; 800 lb breaking strength.	Guy rope	6Z7920.3
SPRING: Fastener FT–9; helical extension type; .177″ dia steel wire zinc plated; 3″ lg x $\frac{7}{8}$″ dia o/a; 4 turns.	Holder for tightening guy	2Z4309
THIMBLEYE: steel; olive drab iridite; eye shaped; 1″ lg x $\frac{7}{16}$″ wd x $\frac{3}{16}$″ thk.	To attach hook snap	5B18053

9. Guy Stake Assembly

Name of part and description	Function of part	Signal Corps stock No.
GUY STAKE GP–111/G: steel; 18½″ lg x 1¼″ x 1¼″ pointed angle iron.	For anchoring guy	2A3328–111
HOOK: malleable iron; galv; one coat olive drab enamel w/one coat primer; hook shaped snap w/spring tongue; 2⅞″ lg x ¹³⁄₁₆″ wd x ⅝″ thk o/a.	To fasten guy to stake	2Z5045–17
RING, retainer: steel; zinc plated; olive drab iridite finish; 1¾″ lg x 1⅛″ wd x .177″ dia stock.	To connect snap to guy stake	

10. Halyard MX–516/GRA–4

Name of part and description	Function of part	Signal Corps stock No.
BLOCK, pulley: Sig C Block FT–127 tackle block type; nylon rope; 2⅝'' lg x ¾'' thk o/a; malleable iron; zinc coated; olive drab iridite.	Used with Halyard MX–516/GRA–4	6R7458
CLAMP: brass; ⅝'' lg x 5/16'' wd x .255'' d o/a	To protect end of halyard wire	
CLAMP: brass; one coat olive drab enamel w/one coat primer; ⅝'' lg x .506'' wd x .375'' h o/a; designed to hold 2 lays of 3/16'' dia rope.	To clamp rope lays on Halyard MS–516/GRA–4	6Z1932–38
CLAMP: brass; nickel pl; olive drab iridite; 1¾'' lg x ¾'' wd x 15/32'' h o/a.	Used to fasten halyard to reel, to r-f cable adapter, or to Wire W–120.	6Z1932–39
HOOK, snap: malleable iron; galv; one coat olive drab enamel w/one coat primer; hook shaped snap w/spring tongue; 2⅞'' lg x 13/16'' wd x ⅝'' thk o/a; mtd by ⅜'' ID hole 1 end, ½'' loop other end.	To attach Halyard MX–516/GRA–4 to guy plate.	2A1400–1
HOOK: steel; galv; olive drab iridite; 1¾'' lg x ⅞'' wd x 3/16'' thk o/a.	To attach snap hook to block pulley	2Z5045–17
INSULATOR, strain: ceramic; brown glaze; cylindrical; 3'' wd x ¾'' thk x 4'' lg 450 lb tensile strength.	Used to insulate lines of Halyard MX–516/GRA–4.	3G3552–24.1
PULLEY ASSEMBLY: c/o snap hook, S-hook, pulley block; malleable iron; zinc coated, olive drab finish; 6½'' lg x 1'' wd x ¾'' thk o/a.	Used to attach halyard to guy plate	
ROPE: nylon; twisted; 3/16'' dia; olive drab finish; mildewproofed; 800 lb breaking strength; 140' lg; 1 end terminated by single clamp, other end tied to insulator.	Part of Halyard MX–516/GRA–4	6Z7920.3
THIMBLEYE: steel; olive drab iridite; eye shaped; 1'' lg x 7/16'' wd x 3/16'' thk.	Used to provide an eye in the halyard to attach to fastener.	5B18053

11. Radio Frequency Cable Adapter UG–1024 U

Name of part and description	Function of part	Signal Corps stock No.
CAP, dust: brass silver plate.	Used to protect Receptacle UG–290/U.	2Z1607–75
CONNECTOR: Jack UG–261/U; 1 cont, female, round; straight type; 1″ lg x 1″ wd x 1″ h; r-f connector; Styramic.	Used to connect Radio Frequency Cable Assembly CG–789/U to antenna wire.	2Z3021–261
GASKET: neoprene; 4 holes; rectangular, 4 large chamfers and indentation on ea side; 3⅝″ lg x 1⁹⁄₁₆″ wd x .070″ thk.	Used between two sections of cable adapter.	2Z4868.1313
INSULATOR, feedthru: plastic, XXX grade, brown; flat, rectangular, 4 large chamfers; 2.563″ wd x 3.625″ lg x 1.563″ thk; mtd by four .171″ dia holes; 10,000 psi tensile strength, 36,000 psi compressive strength; mtg hdw c/o 4 RH mach screw, 4 stop nuts.	Part of Radio Frequency Cable Adapter UG–1024/U.	
INSULATOR, feedthru: plastic, XXX grade, brown; flat, rectangular, 4 large chamfers; 2.563″ wd x 3.625″ lg x 1.563″ thk; mtd by two .257″ dia holes 2.500″ c to c; 10,000 psi tensile strength, 36,000 psi compressive strength; mtg hdw c/o 2 binding posts, 2 lockwashers, 2 tee nuts, 2 wingnuts.	Part of Radio Frequency Cable Adapter UG–1024/U.	
PLATE, mounting: brass; copper flash; nickel finish; double cont chrome; olive drab iridite; two .221″ dia mtg holes .312″ c to c.	Used to mount Reel Assembly RL–122/GRA–4 or Halyard MX–516/GRA–4 to Radio Frequency Cable Adapter UG–1024/U.	2Z7090.252
TERMINAL, stud: brass; copper flash; nickel finish; double cont chrome; olive drab iridite; .810″ lg x .620″ wd x 1¼″ h.	To attach Reel Assembly RL–122/GRA–4 to Radio Frequency Cable Adapter UG–1024/U.	

12. Insulator MX–384/GRA–4

Name of part and description	Function of part	Signal Corps stock No.
BOLT, machine: steel; SAE; cad pl; hex.; thd ½–13, class 2 fit; 1⅛″ nom lg; 1 lockwasher furnished.	To attach insulator to tube.	
BOLT, machine: steel; SAE; cad pl; hex.; thd ½–13, class 2 fit, 1″ min lg; 2½″ nom lg; 1 lockwasher furnished.	To attach insulator to tube.	
INSULATOR, stand-off: brown; cylindrical; ⅝″ thk x 3″ lg x 2⅝″ wd; mtg hdw c/o 2 pins, 2 hex. head bolts, 2 lockwashers	To prevent current flow through mast section to ground stake.	
MOUNTING, tube: aluminum; one coat olive drab enamel w/one coat primer; hollow shaft w/plug in 1 end which mts binding post; 7¹⁵⁄₃₂″ lg x 1.625″ dia o/a.	Part of Insulator MX–384/GRA–4.	
MOUNTING, tube: aluminum; one coat olive drab enamel w/one coat primer; hollow shaft w/plug in 1 end; 6²¹⁄₃₂″ lg x 1.622″ dia o/a.	Part of Insulator MX–384/GRA–4.	
PIN: steel; cylinder; chamfered ends; ¹⁵⁄₃₂″ lg x .125″ dia o/a.	Used to lock Insulator MX–384/GRA–4 in position.	
PIN: brass; cylinder; 7⁄16″ lg x .062″ dia o/a.	To secure binding post on Insulator MX–384/GRA–4.	
POST, binding: brass, silver; ²¹⁄₃₂″ o/a of post, above mtg surface, ⅜″ OD of post; ⅜″ lg, #6 stud; ³⁄₃₂″ max dia of wire hole.	Used to connect Radio Frequency Cable Assembly CG–784/U to vertical antenna.	

13. Mast Base AB–154/U

Name of part and description	Function of part	Signal Corps stock No.
MOUNTING, antenna: aluminum; one coat olive drab enamel w/one coat primer; yoke on bottom, hollow cylinder on top; 1⅝″ lg x 1⅜″ wd x 4¾″ h; mtd by two .343″ dia holes in yoke.	Part of Mast Base AB–154/U	2A2665–29
PIN, straight: SS; cylindrical w/hole at ea end; 2⁹⁄₃₂″ lg x ⁵⁄₁₆″ dia	Used to join stake to mast holder	6L3945–36–1
PLATE, base: aluminum; 1 coat olive drab enamel w/one coat primer; disk shaped w/.656″ dia hole in ctr; 6″ dia x .091″ thk o/a; mtd by .656″ dia hole.	Used to support Mast Base AB–154/U	2Z7090.251
STAKE, guy: cone pointed; approx 12″ lg x ⅝″ dia w/2⅛″ lg x 1¼″ dia cap.	Used to secure Mast Base AB–154/U	2A3330–18

14. Mast Section AB–85/GRA–4

Name of part and description	Function of part	Signal Corps stock No.
MAST SECTION: 1 piece construction; aluminum tubing; 1.355″ dia at base, 1.620″ dia at top, 36″ lg sect.	Used as section of antenna	
CLIP ASSEMBLY, tube contact: aluminum; anodized dull black; ½″ thk cap w/four .250″ dia cont fingers; 3½″ lg x 1.384″ dia.	Used to obtain positive contact between Mast Sections AB–85/GRA–4.	
PIN, roller: steel; split hollow pin; 1.625″ lg x .264″ dia o/a; pressure mtd.	To secure mounting contacts	

15. Radio Frequency Cable Assembly CG–784/U

Name of part and description	Function of part	Signal Corps stock No.
CONNECTOR: pin type plug; 1 round male cont; $3\frac{1}{32}''$ lg x $\frac{9}{16}''$ dia o/a; Insuline Radio Prod part No. 885B.	Terminates one end of Radio Frequency Cable Assembly CG–784/U.	2Z3022–174
PLUG UG–260/U: 2 cont, male, coax, pol; $3\frac{1}{32}''$ lg x $\frac{9}{16}''$ dia; brass, silver pl; Styramic; .295'' dia max cable opening.	Mates with Plug UG–261/U on Radio Frequency Cable Assembly CG–789/U.	2Z7390–260
RADIO FREQUENCY CABLE RG–59A/U: coax; 73 ohms nom impedance, 21 µµf nom capacitance per ft, 2300 v rms max voltage rating; inner cond data, 1 solid steel copper covered #22 AWG; outer cond data, braid, copper wire.	R-f transmission line	1F425–59A

16. Radio Frequency Cable Assembly CG–789/U

Name of part and description	Function of part	Signal Corps stock No.
JACK UG–262/U: 2 cont, female, coax; straight type; 1'' lg, cylindrical, $\frac{9}{16}''$ dia; r-f to 3000 mc, 500 v; r-f connector; Styramic; $\frac{1}{4}''$ dia max cable opening.	R-f cable termination	2Z7390–262
PLUG UG–260/U: 2 cont, male, coax; straight type; 1'' lg, cylindrical, $\frac{9}{16}''$ dia; r-f to 3000 mc, 500 v; r-f connector; Styramic; $\frac{1}{4}''$ dia max cable opening.	R-f cable termination	2Z7390–260
RADIO FREQUENCY CABLE RG–59A/U: coax; 73 ohms nom impedance, 21 µµf nom capacitance per ft, 2300 v rms max voltage rating; inner conductor data, 1 solid steel copper covered #22 AWG; polyethylene dielectric; outer cond data, braid, copper wire.	R-f transmission line	1F425–59A

17. Reel Assembly RL–122/GRA–4

Name of part and description	Function of part	Signal Corps stock No.
CLAMP: brass; 1 bolt; 1'' lg x 1'' wd x 1'' h	Clamps wire on Reel RL–122/GRA–4	6Z1932–37
CLAMP, electrical: brass; double cont chrome; olive drab iridite; bolt and clamp type; $2\frac{1}{8}$'' lg x $\frac{5}{8}$'' wd x $\frac{3}{4}$'' h; designed to hold Wire W–120.	Antenna wire termination	2Z2642.502
COVER: black plastic; hollow cylinder; $1\frac{7}{16}$'' lg x $\frac{3}{8}$'' dia o/a; mtd by .187'' dia hole in ctr.	Grip for reel cranks handle	
HANDLE: aluminum; $2\frac{5}{32}$'' lg x .372'' wd x $\frac{3}{8}$'' thk o/a; plain shaft grip.	To wind or unwind reel	
HANDLE: aluminum; w/black plastic cover; $2\frac{5}{32}$'' lg shaft $\frac{3}{8}$'' dia; $1\frac{11}{32}$'' lg base $\frac{1}{2}$'' wd x $\frac{3}{8}$'' thk; cylindrical handle w/base plate.	To operate Reel RL–122/GRA–4	2Z4928–104
MOUNTING: aluminum; two .125'' dia holes for handle retaining pin, two .159'' dia mtg holes .968'' c to c.	To mount handle to reel	
MOUNTING, bracket: aluminum; one coat olive drab enamel w/one coat primer; .128'' thk plate w/$4\frac{1}{8}$'' lg U-bend; $12\frac{1}{2}$'' lg x 1'' wd x $1\frac{7}{32}$'' thk o/a; mtd by two .204'' dia holes .562'' c to c at 1 end; two .221'' dia holes .312'' c to c and one $\frac{5}{16}$'' dia hole at other end.	To mount reel	
PIN, hinge: steel, olive drab iridite; cylinder; .625'' lg x .125'' dia	Used to hinge handle to handle base	
REEL, wire: hand operated; 150' antenna wire capacity; aluminum; one coat olive drab enamel w/one coat primer; $4\frac{3}{8}$'' dia x $1\frac{7}{16}$'' wd.	For winding, storing, and dispensing antenna wire.	2A3098–6
SHAFT: brass; silver pl; $2\frac{3}{8}$'' lg x .250'' dia o/a; mtd by $\frac{1}{2}$'' threaded sect. $\frac{1}{4}$–20 NC–2 thd 1 end, riveted other end.	Mounts reel to bracket	
SPRING: torsion type; .022'' dia; steel; cad pl; olive drab iridite; $\frac{7}{8}$'' lg x .184'' wd x $\frac{5}{32}$'' thk o/a; 5 turns.	To hold down handle on Reel Assembly RL–122/GRA–4.	

WASHER, flat: round; aluminum; ctr hole .257″ dia x 1¼″ OD x .125″ thk.	Spacer	6L34004-5
WIRE, W-120: electrical; bare; round; 42 strands #32 AWG; silicon bronze:	Antenna wire	1A120

[AG 413.44 (16 Sep 53)]

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